REGIONAL DISTRICT OF NANAIMO

REQUEST FOR PROPOSAL

December 22, 2016

The Regional District of Nanaimo (RDN) is seeking responses to the following Request for Proposal:

Regional District of Nanaimo Transportation and Emergency Planning Services Department Fire Rescue Engine Vehicle Purchases – 2017 Request for Proposal:

RFP No. 17-01

This Request for Proposal is for the Proponent selection to design, construct and deliver **Two (2) Single-Axle, 4-Door Fire Rescue Engine Vehicle Purchases – 2017** for use at the Errington Volunteer Fire Department (EVFD). Copies of the Proposal form may be obtained on or after **December 22, 2016** at the RDN, Administration Building, or can be downloaded from our website: *www.rdn.bc.ca*. **Copies will be mailed upon request.**

Proposals sent by facsimile (fax) or e-mail will not be accepted.

There will be no public opening for this RFP.

Proposals are to be submitted in sealed envelopes clearly marked with:

1. RFP No. 17-01
2. "Two (2) Single-Axle, 4-Door Fire Rescue Engine Vehicle Purchases – 2017"
3. Name and address of the Proponent.
4. Closing **2:00 pm** (PST) on **February 03, 2017.**

Regional District of Nanaimo
Main Reception Desk (2nd Floor) Administration Building
6300 Hammond Bay Road
Nanaimo, BC V9T 6N2

Both Fire Rescue trucks will be shown at the BC Fire Chiefs conference June 3-7, 2018 Victoria, BC (at the manufacture's cost) delivery to EVFD will be after this event/date.

Proponents are required to respond to **all specifications** in order to be considered a valid Proposal.

Proposals may be withdrawn before the deadline upon written notice (facsimiles of notice will not be accepted) to Doug Gardiner, Fire Services Coordinator at the address noted (within this document).

Proposals must remain valid for **90 days** following the closing time and date. Proposals are irrevocable after the closing time and date.

The RDN reserves the right to reject any and all proposals for any reason or to accept any proposal that the RDN, in its sole unrestricted discretion, deems most advantageous to itself. The lowest or any proposal may not necessarily be accepted. The proponent acknowledges the RDN's rights under this

clause and absolutely waives any right of action against the RDN for the RDN's failure to accept its proposal whether such right of action arises in contract, negligence, bad faith or any other cause of action. The acceptance of any proposal is subject to funds being legally available to complete this transaction and/or approval by the Board of the RDN or the officer or employee of the RDN having authority to accept the proposal. A Contract will not necessarily result from this Request for Proposal ("RFP").

Unless otherwise requested in writing by the herein designated RDN employee, a proponent must not contact or communicate with any elected or appointed officer or employee of the RDN other than the designated employee in relation to the proposal prior to the award of such proposal as outlined herein. Any such communication will result in disqualification of the proposal from further consideration.

The RDN is subject to the provisions of *The Freedom of Information and Protection of Privacy Act*. As a result, while Section 21 of the *Act* does offer some protection for third party business interests, the RDN cannot guarantee that any information provided to the RDN can or will be held in confidence.

Information regarding the specifications in this solicitation may be obtained from:

Doug Gardiner
Fire Services Coordinator
Regional District of Nanaimo
or
Darren Marshall
Manager, Fleet, Project and Emergency Planning Services
Regional District of Nanaimo
6300 Hammond Bay Road
Nanaimo, BC
V9T 6N2

250-390-4111 (tel) or toll free in BC 1-877-607-4111

PROPOSAL FORM

TRANSPORTATION and EMERGENCY PLANNING SERVICES (RDN)

FIRE RESCUE ENGINE VEHICLE PURCHASES - 2017

The RDN has signed the Provincial Climate Action Charter. This includes a commitment to reduce greenhouse gas emissions associated with corporate operations and to purchase carbon offsets for the emissions it cannot eliminate. Integrating the most fuel efficient vehicles available into the RDN's fleet is a priority.

The purpose of this Proposal is to obtain two (2) vehicles for purchase. The preferred vehicles will have a diesel powertrain. The vehicles should be configured the same as described in the proposal form to be considered.

Used vehicles will not be considered for this Proposal.

For the following Proposal, a description of the vehicles is provided. This is intended to guide responses to this Proposal. The RDN requests that the cost and availability of Alternative Options be provided, if available.

THE PRIMARY OBJECTIVES FOR THIS VEHICLE REPLACEMENT ARE TO:

- obtain vehicles that meet the fire/rescue service requirements of the EVFD;
- maximize fuel economy and minimize greenhouse gas emissions;
- obtain optimal vehicle safety;
- obtain good warranty coverage; and
- ensure demonstrated mechanical reliability.

VEHICLE DESCRIPTION:

Preferred Vehicle Type:

Two (2) Single-Axle, 4-Door Fire Rescue Engines

Fire Rescue Engines within the RDN are used by Volunteer Fire Department staff in their respected communities as first responders and in the event of structural and brush fires.

Proposal Submissions:

1. Please complete a separate specification form for each proposed vehicle.
2. Please provide apparatus details (as per instructions to Proponent) for each proposed vehicle.

ENQUIRES:

Questions are to be submitted in writing within three (3) business days of the closing date, quoting the RFP name and number and send to email: dgardiner@rdn.bc.ca

Any questions after January 31, 2017 will not be replied to.

TABLE OF CONTENTS

APPENDIX A – RECEIPT CONFIRMATION FORM

RDN – ERRINGTON VOLUNTEER FIRE DEPARTMENT

REQUEST FOR PROPOSALS – RFP No. 17-01

PROPONENT to DESIGN, CONSTRUCT and DELIVER TWO (2) 2017 DIESEL – FIRE RESCUE ENGINE VEHICLES

Please complete this form and send it to the noted RDN representative to receive addendums:

Doug Gardiner, Fire Services Coordinator
Regional District of Nanaimo
6300 Hammond Bay Road
Nanaimo, BC V9T 6N2
Email: dgardiner@rdn.bc.ca

Name of Proponent: _____

Address: _____

Province/State: _____ Postal Code: _____

Telephone No: _____ _____

E-mail: _____

Contact Person: _____

Title: _____

It should also be noted that the RDN/EVFD have met, or had discussions, with several Fire Engine Vehicle Proponents in the past few months to develop a concept and guide for this request for proposal. While these meetings have been helpful, they were intended for research purposes only and do not represent any commitment to purchase.

If this form is not completed and sent to the RDN the Proponent will be responsible to ensure they have retrieved all addendums from the RDN website (www.rdn.bc.ca) prior to their submission of their Proposal.

APPENDIX B – RDN/EVFD INSTRUCTIONS TO PROPONENT

INSTRUCTIONS TO PROPONENT:

1. Sealed Proposals clearly marked **"Proposal for Design, Construct and Deliver Two (2) Single-Axle, 4-Door Fire Rescue Engine Vehicle Purchases 2017"** will be received by hand or courier only at: Regional District of Nanaimo 6300 Hammond Bay Road, Nanaimo, BC V9T 6N2 (Main Reception 2nd Floor) **up until 2:00 pm (PST) on February 3, 2017.** Faxed copies will not be accepted.

2. Proponents may submit two (2) different proposals for each vehicle (including trade).

3. If alternative solutions are offered, please submit the information in the same format as a separate Proposal.

4. **This is a Request for Proposals and not a tender call.**

5. The purchaser of these proposed Fire Rescue Engines will be the RDN, 6300 Hammond Bay Road, Nanaimo, BC V9T 6N2. For the purpose of this proposal the RDN and the EVFD shall be considered one and the same.

5. Proposals received in the RDN offices after the above-mentioned time and date will be returned unopened.

6. Proposals **must be submitted on the attached forms** and must be authorized by a signing officer of the Proponent's company. **The entire Proposal must be returned to RDN with each page initialed**.

7. This document and completed forms will become part of the contract documents between the RDN/EVFD and the successful Proponent.

8. The RDN/EVFD reserve the right to not accept any proposals or minor irregularities of proposals at their own discretion. The lowest or any proposals will not necessarily be accepted.

9. Proponents are solely responsible for their own expenses in preparing the Proposals. If the RDN/EVFD elects to reject any or all Proposals, the RDN/EVFD will not be liable to any Proponent for any claims, or for costs or damages incurred by the Proponent in preparing the Proposals, loss of anticipated profit in connection with any final contract, or any other matter whatsoever.

10. Proposals will be evaluated by RDN/EVFD who will consider proposals best meeting the intent of this request, e.g., quoted price, delivery time, specification/quality workmanship and warranty/service, etc. Equivalencies from other proposers may be considered and evaluated on a case-by-case submission.

11. Evaluation of Proposals will be done by a committee formed by the RDN/EVFD who will be reviewing and scoring submitted proposal documents. The RDN/EVFD reserve the right to accept any or none of the proposals submitted and will evaluate proposals based on the best value and not necessarily the lowest cost. The RDN may also select submissions, either from one proponent or one each from two separate proponents.

    Acceptance of any proposal will be subject to budgetary considerations and RDN/EVFD Board approval. The evaluation criteria matrix can be found on page 18; Appendix "I".

    By responding to this RFP, Proponents will be deemed to have agreed that the decision of the Evaluation Committee will be final and binding.

12. The RDN/EVFD estimate that this contract will be awarded within four (4) to twelve (12) weeks of the closing date. All Proponents submitting Proposals for the project will be advised as to the outcome of this RFP in writing.

13. Proprietary names, unless otherwise stated, are used solely to establish standards of materials and finish. Items of other manufacture may be accepted as equal to those specified, at the discretion of RDN/EVFD.

14. Prices, in Canadian currency, shall include all packing, crating, freight, cartage, shipping charges, all tariffs, environmental fees, duties and taxes.

15. Inquiries during submission of proposals shall be directed to: Doug Gardiner, RDN Fire Services Coordinator, (250) 390-4111, during RDN work hours. It is the sole responsibility of the potential Proponent to check with the RDN to ensure that all available information has been received prior to submitting a proposal. Any interpretation of, additions to, deletions from, or any other corrections to this request for proposal, will be issued as written addenda. All questions must be emailed to Doug Gardiner (dgardiner@rdn.bc.ca). Proponents that complete the receipt confirmation form, page 5, Appendix "A", will be emailed addendums.

16. Proposals may be withdrawn by written notice only, provided such notice is received prior to time set as closing time for receiving Proposals.

17. Proposals must remain valid for 90 days following the closing time and date. Proposals are irrevocable after the closing time and date.

18. Each Proponent shall state on the documents provided to be submitted as part of their Proposal, information regarding their previous contracts; page 17, Appendix "H".

19. The Proponent shall respond to the specifications on the attached documents. These documents allow comparisons of what is being offered by each Proponent against the specification. **Responses not on this document will be rejected.**

20. If only a portion of the item is being offered or an alternative is offered, Proponents shall type the number and specification on page 20, Appendix "K" form and explain the exception/variation. If the explanation requires more space, please provide an extra sheet noting page and item numbers.

21. If the Proponent is not meeting the specifications or not providing the item, note the page and item number and specification on the Appendix "K" form; indicating why you are not meeting the specification. Please note that making an exception will not eliminate the Proponent from this process as long as there is an exception noted that can be evaluated.

Examples:

NUMBER AND SPECIFICATION	*EXCEPTION/VARIATION*
37. FRONT BRAKE DUST SHIELDS The front axle shall be equipped with brake dust shields.	Not supplied
122. WHEELBASE The chassis wheelbase shall be 185.00 inches.	A chassis with a wheelbase of 190.00 inches will be supplied

22. The RDN has the right to communicate with the Proponent to clarify any unclear specifications

23. The terms of any proposals must be approved by the RDN/EVFD before acceptance.

24. **Insurance:**

The Proposer will be responsible for the safe keeping and storage of the vehicle during construction and will be liable and responsible for any damage to this vehicle prior to and following the transfer of title.

The successful Proposer shall submit to the RDN/EVFD, upon acceptance of the proposal and prior to commencement of the work, a Certificate of Insurance containing the following:

a) Commercial General Liability, including products and completed operations, in an amount not less than five million dollars ($5,000,000.00).

b) Proof of Garage Policy with a limit not less than three million dollars ($3,000,000.00).

25. **Default:**

a) If the Proponent for any reason whatsoever fails or defaults in respect of any matter or thing which is an obligation of the Proponent under the terms of this Proposal, the RDN at its option may consider the Proponent has abandoned the offer made or the Contract, if the offer has been accepted, whereupon the acceptance, if any, of the RDN shall be null and void and the RDN shall be free to select an alternate solution of its choosing.

b) The RDN/EVFD may, if the Proponent fails to deliver the Fire Rescue Engines within the delivery time specified, require the Proponent to pay the RDN/EVFD as liquidated damages, the sum of three hundred ($300.00) Canadian Funds for each day of delay.

c) The Proponent shall not be liable for any excess costs under the terms of this Proposal if failure to perform the Contract arises by reason of Force Majeure, acts of God or acts of the RDN/EVFD.

26. **General Specifications:**

a) Notwithstanding any other requirements, the unit shall meet the requirements contained in the Canadian Motor Vehicle Safety Standards, and the applicable British Columbia Provincial requirements.

b) All provisions of the current CAN/ULC-S515-04 Second Edition shall apply and be considered part of these specifications regardless of whether it is written in specifications or not.

c) The unit, when delivered, shall have listed and bear the label of the CAN/ULC.

d) All threaded connections shall meet the following specifications:
   i. 1.5" (38 mm) = NPSH
   ii. 2.5" (65 mm) = British Columbia Fire Thread
   iii. 4" (102) Strotz Fittings

e) Apparatus lights and reflectors shall conform to the *British Columbia Motor Vehicle Act*.

f) A weight distribution calculation shall be provided with the proposal; in kilograms and pounds.

g) Electrical load estimation for each Fire Rescue Truck shall be provided with the proposal.

h) Manufacturer shall provide NFPA/ULC test data to confirm the carrying capacity of the water tank for each Fire Rescue Truck. Tank must carry the specified amount of water.

27. **Delivery, Orientation and Inspections:**

a) The manufacturer will deliver the completed apparatus' under its own power to the destination specified and provide at least eight-hours over two (2) days of orientation to the fire department on the operation of the main equipment supplied on the apparatus.

b) Delivery of each apparatus is expected no later than twelve (12) to fourteen (14) months after approval of design.

c) Prior to the final delivery, the vehicle will be professionally cleaned and polished. The Contractor is to notify the RDN/EVFD not less than five (5) days prior to expected delivery/arrival to permit final inspection scheduling.

d) With respect to the EVFD Proposal, final delivery to be F.O.B. (freight pre-paid) Errington Fire Halls, 960 Errington Road, Errington, BC V0R-1VO. Both Fire Rescue trucks will be shown at the BC Fire Chiefs Conference June 3-7, 2018 Victoria BC (at the manufacture's cost) delivery to EVFD will be after this event/date.

e) The Proponent will provide for two (2) inspection trips to the manufacturer's plant, which will include travel costs (air/ferry/vehicle) and meals for two (2) persons. If a single round trip total travel is more than 400 km, a minimum of two nights separate accommodation (hotel/motel) and one (1) rental car for two (2) representatives of the fire department shall be provided for each build.

f) The RDN/EVFD will have access to the truck builds at any time during the Proponents normal working hours, as long as the Proponent has sufficient notice; 24 hours. Any expenses incurred for this type of inspection will be at the expense of the RDN/EVFD.

g) The Proprietor will conduct the pre-construction meeting by teleconference, or in person at the RDN's expense. The first on-site inspection will be prior to painting the body and the second on-site inspection will be pre-delivery, to ensure that all aspects of the Proposal have been complied with. Prior to meeting [two (2) days] documentation and pictures will be sent to RDN/EVFD for review and discussion.

h) The final inspections will be at 960 Errington Road, Errington, BC V0R-1VO. The Proponent will be responsible to insure that all transport damage has been repaired prior to delivery. Final acceptance also includes that all paperwork to conclude transfer of vehicle ownership and purchase of ICBC insurance must be in state of readiness (includes weigh scale slips, Provincial inspections, etc.)

28. **Documentation at Time of Delivery**

The Supplier is to provide the following documentation upon delivery for both EVFD Fire Rescue vehicles. Please note that the proponent will also supply, on disc or thumb drive, an electronic copy of all manuals:

a) The Proponent shall have keys, or Fobs, four (4) sets;
b) The Proponent shall supply, for each Fire Rescue Truck, **drawings** of the apparatus being proposed. The drawings shall show all four sides and top of the apparatus. The drawings are extremely important, as they can easily resolve any questions as to items that are unclear in the specifications. Drawings of similar apparatus are NOT acceptable.
c) One (1), for each Fire Rescue Truck, sets of **as-built electrical wiring schematics** to cover any and all wiring not installed by chassis manufacturer. This diagram to include part numbers and brand names of switches, lights, etc., of parts used. This schematic shall be specific to both apparatus";
d) Available for inspection one (1), for each Fire Rescue Truck, quality **parts catalogue and service manual** covering the entire Fire Rescue Trucks. This also will include a list of all belts, hoses, and filters; including part numbers, manufacturer and use and complete drive train available for inspection by the purchaser. This must include any equipment supplied with Fire Rescue Trucks;
e) Manufacturer's **certificate of origin**;
f) **Schedule of guarantees/warranties** document and certifications shall be provided;
g) One (1), for each Fire Rescue Truck, complete **overhaul manuals** to cover, but not limited to, tires, engine, batteries, pumps, transmission, rear axle, electrical components to cover the completed Fire Rescue Truck. They will include as-built wiring schematics of chassis;
h) One (1), for each Fire Rescue Truck, **pump manuals** covering repair and operation of pump;

i) **Calculations** showing grade ability and speed, i.e., calculations of the apparatus center of gravity for both Fire Rescue Trucks;
j) Any **special tools** that will be required in the care and maintenance or overhaul of the Fire Truck and its components;
k) All **fluid capacities** in litres;
l) A **permanent plate** will be mounted in the driver's compartment, on both Fire Rescue Trucks, specifying the quantity and type of fluids required including engine oil, engine coolant, transmission, pump transmission lubrication, pump primer and drive axle.
m) The manufacturer shall supply, at the time of delivery, one (1), for each Fire Rescue Truck, complete **operation and maintenance manuals** of the completed apparatus as delivered, including but not limited to the chassis, pump, wiring and firefighting equipment, and;
n) Manufacturer shall state **angles of approach and departure** for each Fire Rescue Truck being proposed. The **break-over angle** shall be shown on the actual apparatus drawing.

APPENDIX C – QUOTED PRICE

PROPONENTS ARE TO COMPLETE THIS PAGE AND ATTACH THIS PAGE TO THE FRONT OF EACH OF THEIR PROPOSAL

The undersigned Proponent, having carefully read and examined the Instructions to Proponents, Proposal Forms, Schedule of Prices, General Conditions of a Contract and having full knowledge of the work required, does hereby offer to provide all necessary materials in strict accordance with the RFP and to do all therein called for on the terms and conditions and under the provisions therein set forth at the:

LUMP SUM TOTAL QUOTED PRICE OF $_____ (from total on page 13)

The above price includes and covers duties, taxes, handling and transportation charges, and all other charges incidental to and forming part of this Proposal. The Proponent shall be responsible for Customs clearance and payment of any duties and/or taxes owing at time of importation into Canada, as applicable.

Name of Proponent:
_____

Address: _____

Telephone No.: _____

Name, Signature, and Title of
Signing Officer: _____

Date: _____

E-mail: _____

In no case shall the RDN/EVFD be liable for damages to any Proponent as a result of any breach or breaches by the RDN/EVFD or of any term or terms of any contract, which is formed between the Proponent and the RDN/EVFD as a result of the submission of a Bid in response to this Proposal.

I, the Proponent, namely; _____has read the preceding limitation of damages clause and agrees that the RDN/EVFD liability is limited as set out in that clause.

Date: _____

Name of Proponent Signing Officer: _____

Signature of Proponent Signing Officer: _____

APPENDIX D – SCHEDULE OF PRICES

The RDN/EVFD shall pay in lawful money of Canada the amount shown for the following items subject to the conditions of this document.

PRICE FOR FIRE RESCUE TRUCK (all minimum requirements met): **Y / N**

Proponents making an offer for trade please note the unit number: (211 or 212): _____

DESCRIPTION	PRICE
For the design, construction and delivery of: Fire Rescue Truck	**$**
SUBTOTAL	**$**
Less Trade-in (if applicable)	**$**
5% GST	**$**
7% PST	**$**
Environmental Taxes & Levies	**$**
TOTAL	**$**

Equipment shall be delivered F.O.B. (freight pre-paid) to the RDN, Errington Volunteer Fire Department, 960 Errington Road, Errington, BC V0R1VO.

_____

Initials of Signing Officer

APPENDIX E – SPECIFICATIONS OF EVFD POTENTIAL TRADE-IN

1996 Freightliners, Two (2) WHDR, Fire Engines	
Engine:	Diesel Cummings (211 & 212)
Pump Size:	625 GPM (211 & 212)
Water Tank size:	500 gallon (211 & 212)
Odometer:	211– 101,106 km Dec 10/16 212 – 46,539 km Dec 10/16
Serial Number:	211– 1FV3HFAAXTL724172 212 – 1FV3HFAA1TL724173
Dimensions: 211 and 212	Length – 278" Wheel Base –162" Height – 9”10" Width – 96"
ULC Plate:	1996 (211 & 212)
Anderson number	212 – 940140IAPE95002810
	211 – 940140IAPE95002805

Unit #211- 1FV3HFAAXTL724172

Unit #212- 1FV3HFAA1TL724173

APPENDIX F – EVFD OPTIONAL EQUIPMENT – PRICE SEPARATELY

Optional Equipment Description	Price
One (1) backup camera.	$
One (1) 1 ¾ pony hose from connection to rear of truck.	$
One (1) 2 ½ pony hose from connection to rear of truck.	$
One (1) engine block heater.	$
One (1) larger Alternator than 270 amp.	$
Two (2) 6 lb. fiberglass handled axe.	$
One (1) 48" long crow bar.	$
One (1) 15” length of Kochek 4" lightweight hard suction hose supplied by customer.	$
Two (2) 15” lengths of Kochek 6" lightweight hard suction hose.	$
One (1) Northline 6" low level strainer complete with a siphon jet fitting.	$
One (1) Duo-Safety 10-foot folding attic ladder.	$
One (1) Duo-Safety 12-foot ladder with folding hooks.	$
One (1) Duo-Safety 26 foot three section ladder supplied by customer.	$
Two (2) Task Force TiPS1 ½ " ball valve shutoffs with pistol grip, 1 1/16” smooth bore tip, & forestry couplings	$
One (1) Duo-Safety 8-foot fiberglass handled pike pole.	$
One (1) Duo-Safety 10-foot fiberglass handled pike pole.	$
One (1) pair of 12" x 8" aluminum wheel chocks.	$
One (1) floor dry hopper provided on the right side. The hopper floor will be provided with an approximately 2” diameter opening with manual knife valve to allow filling of buckets below. The floor of the hopper will be sloped toward the opening.	$
The RDN will supply a Valley Traffic Systems arrow that will be installed in the large storage area forward of the main hose area. The controller for the arrow board will be located in the cab. Model 50929 by SWS Canada 48" long X 21" high X 2". The arrow will require a custom fabricated flip up frame work complete with auto lift to hold the arrow in the raised position. It will be activated from the cab by a switch. The arrow board when stowed will be near level with the top edge of the body. An ajar switch will be fabricated and wired to the existing door ajar warning system. A light will be supplied in the cab to warn the operator when the doors are not stowed properly; to be discussed further at pre-construction meeting.	$

Total Optional Equipment (before GST and PST) $_____

APPENDIX G – COST SAVINGS INITIATIVES

The RDN/EVFD prefers to provide full payment upon final inspection and acceptance at the RDN/ EVFD locations.

Provide all payment terms and options available and cost saving strategies that will benefit the RDN/EVFD.

Please provide details:

1. Deduction of the two (2) on-site inspections for two (2) persons. (The inspections may become teleconferences) ($_____)
2. _____ ($_____)
3. _____ ($_____)
4. _____ ($_____)
5. _____ ($_____)
6. _____ ($_____)
7. _____ ($_____)

Total potential cost savings (before GST and PST) ($_____)

APPENDIX H – REFERENCES

List of Previous Contracts:

The Proponent will supply the description of the project, date delivered, company name, contact name, contact phone number and contact email address of the most recent three (3) similar fire apparatus the Proponent has supplied in the Province of British Columbia. RDN/EVFD plans on contacting some of these fire departments to inquire as to the nature of the Proponent's performance. If there are special concerns or restrictions on our use of the reference, these concerns must be addressed in the submission.

Description of the project:	
Date Delivered:	
Company Name:	Contact Name:
Contact Phone Number:	Contact e-mail address:

Description of the project:	
Date Delivered:	
Company Name:	Contact Name:
Contact Phone Number:	Contact e-mail address:

Description of the project:	
Date Delivered:	
Company Name:	Contact Name:
Contact Phone Number:	Contact e-mail address:

(If additional space is required, attach a separate sheet)

APPENDIX I – EVALUATION CRITERIA MATRIX

Evaluation Criteria Matrix for

Two (2) Single-Axle, 4-Door Fire Rescue Engine Vehicle Purchases Request for Proposal

The evaluation team will apply the following criteria to the RFP evaluation process:

Price shall mean:

a) Quoted prices from qualifying Proposals.

Delivery Date shall mean:

a) The specified delivery date of two (2) finished Single-Axle, 4-Door Fire Rescue Engines from the confirmed date ordered.
b) Delivery date will be weight based on a monthly basis.

Ability to meet specifications and workmanship shall mean:

a) The direct experience the RDN has had with a Proponent/Manufacturer.
b) Referenced by other municipalities on their experience with a Proponent/Manufacturer. A minimum of three (3) references will be required.

Maintenance/Service/Repair shall refer to:

a) Parts — are parts readily available within BC, Canada, USA, or other.
b) Is technical support readily available during regular business hours either by phone, email or internet?
c) Consideration of types and length of warranty.

1. Price- based on	40%
2. Delivery Time	10%
3. Ability to meet specifications and quality workmanship	30%
4. Warranty/ Service/ Repair and availability of parts	20%

APPENDIX J

TECHNICAL SPECIFICATIONS

ERRINGTON VFD

APPENDIX K – TECHNICAL SPECIFICATIONS FORM
EVFD PROPOSAL FOR TWO (2) SINGLE-AXLE, 4-DOOR FIRE RESCUE ENGINE

If the Proponent is not meeting the specifications or not providing the item, indicate it on this form and note the item number. Please note that taking an exception or indicating "**Not Supplying"** will not eliminate the Proponent from this process as long as there is an exception noted that can be evaluated.

Item #	ITEMS NOT MEETING SPECIFICATION OR NOT PROVIDING THE ITEM

EVFD TECHNICAL SPECIFICATIONS
EVFD PROPOSAL FOR TWO (2) SINGLE-AXLE, 4-DOOR FIRE RESCUE ENGINE

1. STATEMENT OF WORK - (Is there another fire engine number that we could include?)

RDN/EVFD is requesting Proposals for the replacement of Fire Engine #211 and 212 used for providing Fire Protection Services for the Errington Fire Protection Local Service area.

Detailed Specifications:

2. MAXIMUM OVERALL LENGTH - 372" (31')

The overall length of the apparatus shall not exceed 372 inches.

3. MODEL

The chassis shall be a Metro Star-X model. The cab and chassis shall include design considerations for multiple emergency vehicle applications, rapid transit and maneuverability. The chassis shall be manufactured for heavy duty service with the strength and capacity to support a fully laden apparatus, one hundred (100) percent of the time.

4. MODEL YEAR

The chassis shall have a vehicle identification number that reflects a 2017 model year.

5. COUNTRY OF SERVICE

The chassis shall be put in service in the country of Canada (CAN).

The chassis will meet applicable Canadian Technical Standards Document per Canadian Motor Vehicle Safety Regulations as clarified in the incomplete vehicle document which accompanies each chassis. Spartan Chassis is not responsible for compliance to Provincial, regional, or local regulations. Dealers should identify those regulations and order any necessary optional equipment from Spartan Chassis or their OEM needed to be in compliance with those regulations.

6. ADDITIONAL VOCATIONAL STANDARD

The cab, chassis, and components shall be audited to Underwriter's Laboratories of Canada (ULC) current published apparatus specification ULCS-515. The global chassis compliance certification shall be provided to the manufacturer. The chassis as specified shall meet applicable criteria of ULCS-515 and shall include the ULC marking.

7. CAB AND CHASSIS LABELING LANGUAGE

The cab and chassis shall include the applicable caution, warning, and safety notice labels with text to be written in both English and French.

8. APPARATUS TYPE

The apparatus shall be a pumper/rescue vehicle designed for emergency service use which shall be equipped with a permanently mounted fire pump which has a minimum rated capacity of 1050 gallons per minute (4775 liters per min). The apparatus shall include a water tank and hose body whose primary purpose is to combat structural and associated fires.

9. VEHICLE TYPE

The chassis shall be manufactured for use as a straight truck type vehicle and designed for the installation of a permanently mounted apparatus behind the cab. The apparatus of the vehicle shall be supplied and installed by the apparatus manufacturer.

10. AXLE CONFIGURATION

The chassis shall feature a 4 x 2 axle configuration consisting of a single rear drive axle with a single front steer axle.

11. GROSS AXLE WEIGHT RATINGS FRONT

The front gross axle weight rating (GAWR) of the chassis shall be minimum 18,000 pounds.

This front gross axle weight rating shall be adequate to carry the weight of the completed apparatus including all equipment and personnel.

12. GROSS AXLE WEIGHT RATINGS REAR

The rear gross axle weight rating (GAWR) of the chassis shall be minimum 24,000 pounds.

This rear gross axle weight rating shall be adequate to carry the weight of the completed apparatus including all equipment and personnel.

13. PUMP PROVISION

The chassis shall include provisions to mount a drive line pump in the middle of the chassis, behind the cab, more commonly known as the mid-ship location.

14. WATER & FOAM TANK CAPACITY

The chassis shall include a carrying capacity of up to 750 gallons (2839 liters). The water and/or foam tank(s) shall be supplied and installed by the apparatus manufacturer.

15. CAB STYLE

The cab shall be a custom, fully enclosed, MFD model with a 10.00 inch raised roof over the driver, officer, and crew area, designed and built specifically for use as an emergency response vehicle by a company specializing in cab and chassis design for all emergency response applications. The cab shall be designed for heavy-duty service utilizing superior strength and capacity for the application of protecting the occupants of the vehicle. This style of cab shall offer up to eight (8) seating positions.

The cab shall incorporate a fully enclosed design with side wall roof supports, allowing for a spacious cab area with no partition between the front and rear sections of the cab. To provide a superior finish by reducing welds that fatigue cab metal; the roof, the rear wall and side wall panels shall be assembled using a combination of welds and proven industrial adhesives designed specifically for aluminum fabrication for construction.

The cab shall be constructed using multiple aluminum extrusions in conjunction with aluminum plate, which shall provide proven strength and the truest, flattest body surfaces ensuring less expensive paint repairs if needed. All aluminum welding shall be completed to the American Welding Society and ANSI D1.2-96 requirements for structural welding of aluminum.

All interior and exterior seams shall be sealed for optimum noise reduction and to provide the most favorable efficiency for heating and cooling retention.

The cab shall be constructed of 5052-H32 corrosion resistant aluminum plate. The cab shall incorporate tongue and groove fitted 6061-T6 0.13 and 0.19 inch thick aluminum extrusions for extreme duty situations. A single formed, one (1) piece extrusion shall be used for the "A" pillar, adding strength and rigidity to the cab as well as additional roll-over protection. The cab side walls and lower roof skin shall be 0.13 inch thick; the rear wall and raised roof skins shall be 0.09 inch thick; the front cab structure shall be 0.19 inch thick.

The exterior width of the cab shall be 94.00 inches wide with a minimum interior width of 88.00 inches. The overall cab length shall be 131.10 inches with 54.00 inches from the centerline of the front of the axle to the back of the cab.

The cab interior shall be designed to afford the maximum usable interior space and attention to ergonomics with hip and legroom while seated which exceeds industry standards. The crew cab floor shall be flat across the entire walking area for ease of movement inside the cab.

The cab shall offer an interior height of 57.50 inches from the front floor to the headliner in the non-raised roof area and a rear floor to headliner height of 65.00 inches in the raised roof area, at a minimum. The cab shall offer an interior measurement at the floor level from the rear of the engine tunnel to the rear wall of the cab of 49.88 inches. All interior measurements shall include the area within the interior trimmed surfaces and not to any unfinished surface.

The cab shall include a driver and officer area with two (2) cab doors large enough for personnel in full firefighting gear. The front doors shall offer a clear opening of 40.25 inches wide X 53.50 inches high, from the cab floor to the top of the door opening. The cab shall also include a crew area with up to two (2) cab doors, also large enough for personnel in full firefighting gear. The rear doors shall offer a clear opening of 32.25 inches wide X 61.00 inches high, from the cab floor to the top of the door opening.

The cab shall incorporate a progressive two (2) step configuration from the ground to the cab floor at each door opening. The progressive steps are vertically staggered and extend the full width of each step well allowing personnel in full firefighting gear to enter and exit the cab easily and safely.

The first step for the driver and officer area shall measure approximately 11.50 inches deep X 31.50 inches wide. The intermediate step shall measure approximately 8.50 inches deep X 33.00 inches wide. The height from the first step to the intermediate step and the intermediate step to the cab floor shall not exceed 11.00 inches.

The first step for the crew area shall measure approximately 11.50 inches deep X 21.50 inches wide. The intermediate step shall measure approximately 10.25 inches deep X 22.50 inches wide. The height from the first step to the intermediate step and the intermediate step to the cab floor shall not exceed 12.50 inches.

16. OCCUPANT PROTECTION

The vehicle shall include the Advanced Protection System™ (APS) which shall secure belted occupants and increase the survivable space within the cab. The APS shall selectively deploy integrated systems to protect against injuries in qualifying frontal impact, side impact, and rollover events. The increase in survivable space and security of the APS shall also provide ejection mitigation protection.

The system components shall include:

- Driver steering wheel airbag
- Driver dual knee air bags (patent pending) with energy management mounting (patent pending) and officer knee airbag
- Large driver, officer, and crew area side curtain airbags
- APS advanced seat belt system - retractor pre-tensioners tighten the seat belts around the occupants, securing the occupants in seats and load limiters play out some of the seat belt webbing to reduce seat belt to chest and torso force upon impact as well as mitigate head and neck injuries
- Heavy truck Restraints Control Module (RCM) - receives inputs from the outboard sensors, selectively deploys APS systems, and records sensory inputs immediately before and during a detected qualifying event
- Integrated outboard crash sensors mounted at the perimeter of the vehicle - detects a qualifying front or side impact event and monitors and communicates vehicle status and real time diagnostics of all critical subsystems to the RCM
- Fault-indicating Supplemental Restraint System (SRS) light on the driver's instrument panel

Frontal impact protection shall be provided by the outboard sensors and the RCM. In a qualifying front impact event the outboard sensors provide inputs to the RCM. The RCM activates the steering wheel airbag, driver side dual knee airbags (patent pending), officer side knee airbag, and advanced seat belts for each occupant in the cab.

The APS frontal impact system shall be independently tested to ensure occupant injury criteria does not exceed injury criteria defined in Federal Motor Vehicle Safety Standard (FMVSS) 208. Frontal impact into a rigid barrier at 25 mph shall be conducted by an independent third party test facility using belted 95th percentile Hybrid II test dummies.

Rollover, side impact, and ejection mitigation shall be provided by the outboard sensors and the RCM. In qualifying rollover or side impact events the outboard sensors provide inputs to the RCM. The RCM activates the side curtain airbags and advanced seat belts for each occupant in the cab. The RCM measures roll angle, lateral acceleration, and roll rate to determine if a rollover event or side impact event is imminent or occurring.

In the event of a qualifying offset or other non-frontal impact, the RCM shall determine and intelligently deploy the front impact protection system, the side impact protection system, or both front and side impact protection systems based on the inputs received from the outboard crash sensors.

The APS side impact system shall be independently tested to ensure occupant injury criteria does not exceed injury criteria defined in Federal Motor Vehicle Safety Standard (FMVSS) 214. Side impact from a moving barrier at 17 mph shall be conducted by an independent third party test facility using belted 50th percentile ES-2re test dummies.

17. CAB FRONT FASCIA

The front cab fascia shall be constructed of 5052-H32 Marine Grade, 0.13 of an inch thick aluminum plate which shall be an integral part of the cab.

The cab fascia will encompass the entire front of the aluminum cab structure from the bottom of the windshield to the bottom of the cab and shall be the "Classic" design.

The front cab fascia shall include two (2) molded plastic modules on each side accommodating a total of up to four (4) Hi/Low beam headlights and two (2) turn signal lights or up to four (4) warning lights. A chrome plated molded plastic bezel shall be provided on each side around each set of four lamps.

18. FRONT GRILLE

The front fascia shall include a box style, 304 stainless steel front grille 44.45 inches wide X 33.50 inches high X 1.50 inches deep. The grille shall include a minimum free air intake of 732.00 square inches. The upper portion of the grille shall be hinged to provide service access behind the grille.

19. CAB UNDERCOAT

There shall be a rubberized undercoating applied to the underside of the cab that provides abrasion protection, sound deadening and corrosion protection.

20. CAB SIDE DRIP RAIL

There shall be a drip rail along the top radius of each cab side. The drip rails shall help prevent water from the cab roof running down the cab side.

21. CAB PAINT EXTERIOR

The cab shall be painted prior to the installation of glass accessories and all other cab trim to ensure complete paint coverage and the maximum in corrosion protection of all metal surfaces.

All metal surfaces on the entire cab shall be ground by disc to remove any surface oxidation or surface debris which may hinder the paint adhesion. Once the surface is machine ground a high quality acid etching of base primer shall be applied. Upon the application of body fillers and their preparation, the cab shall be primed with a coating designed for corrosion resistance and surface paint adhesion. The maximum thickness of the primer coat shall be 2.00 mils.

The entire cab shall then be coated with an intermediate solid or epoxy surfacing agent that is designed to fill any minor surface defects, provide an adhesive bond between the primer and the paint and improve the color and gloss retention of the color. The finish to this procedure shall be a sanding of the cab with 360 grit paper followed by sealing the seams with SEM brand seam sealer.

The cab shall then be painted the specific color designated by the customer with an acrylic urethane type system designed to retain color and resist acid rain and most atmospheric chemicals found on the fire ground or emergency scene. The paint shall have a minimum thickness of 2.00 mils, followed by a clear top coat not to exceed 2.00 mils. The entire cab shall then be baked at 180 degrees for (1) one hour to speed the curing process of the coatings.

22. CAB PAINT MANUFACTURER

The cab shall be painted with PPG Industries paint.

23. CAB PAINT PRIMARY/LOWER COLOR

The primary/lower paint color shall be: fire engine red, upper cab white

24. CAB PAINT WARRANTY

The cab and chassis shall be covered by a limited manufacturer paint warranty which shall be in effect for ten (10) years from the first owner's date of purchase or in service or the first 100,000 actual miles, whichever occurs first.

25. CAB PAINT INTERIOR

The visible interior cab structure surfaces shall be painted with a multi-tone onyx black texture finish.

26. CAB ENTRY DOORS

The cab shall include (4) four entry doors, (2) two front doors and (2) two crew doors designed for ease of entering and egress when outfitted with an SCBA. The doors shall be constructed of extruded aluminum with a nominal thickness of 0.13 inch. The exterior skins shall be constructed of 0.13 inch aluminum plate.

The doors shall include a double rolled style automotive rubber seal around the perimeter of each door frame and door edge which ensures a weather tight fit.

All door hinges shall be hidden within flush mounted cab doors for a pleasing smooth appearance and perfect fit along each side of the cab. Each door hinge shall be piano style with a 0.38 inch pin and shall be constructed of stainless steel.

27. CAB ENTRY DOOR TYPE

All cab entry doors shall be full length in design to fully enclose the lower cab steps.

28. CAB INSULATION

The cab ceiling and walls shall include 1.00 inch thick foam insulation. The insulation shall act as a barrier absorbing noise as well as assisting in sustaining the desired climate within the cab interior.

29. CAB STRUCTURAL WARRANTY

The cab structure shall be warranted for a period of ten (10) years or one hundred thousand (100,000) miles which ever may occur first. The warranty period shall commence on the date the vehicle is delivered to the first end user.

30. CAB TEST INFORMATION

The cab shall have successfully completed the preload side impact, static roof load application and frontal impact without encroachment to the occupant survival space when tested in accordance with Section 4 of SAE J2420 COE Frontal Strength Evaluation Dynamic Loading Heavy Trucks, Section 5 of SAE J2422 Cab Roof Strength Evaluation Quasi–Static Loading Heavy Trucks and ECE R29 Uniform Provisions Concerning the Approval of Vehicles with regard to the Protection of the Occupants of the Cab of a Commercial Vehicles Annex 3 Paragraph 5.

The above tests have been witnessed by and attested to by an independent third party. The test results were recorded using cameras, high speed imagers, accelerometers and strain gauges. Documentation of the testing shall be provided upon request.

31. ELECTRICAL SYSTEM

The chassis shall include a single starting electrical system which shall include a 12-volt direct current system, suppressed per SAE J551. The wiring shall be appropriate gauge cross link with 311-degree Fahrenheit insulation. All SAE wires in the chassis shall be color coded and shall include the circuit number and function where possible. The wiring shall be protected by 275-degree Fahrenheit minimum high temperature flame retardant loom.

32. APPARATUS WIRING PROVISION

An apparatus wiring panel shall be installed in the center dash area behind the rocker switch panel which shall include eight (8) open circuits consisting of three (3) 20 amps, one (1) 30 amps, three (3)10 amps, and one (1) 15-amp circuit, with relays and breakers with trigger wires which shall be routed to the rocker switch panel.

33. DATA RECORDING SYSTEM

The chassis shall have a Weldon Vehicle Data Recorder (VDR) system installed. The system shall be designed to meet NFPA 1901. The following information shall be recorded:

- Vehicle Speed
- Acceleration
- Deceleration
- Engine Speed
- Engine Throttle Position
- ABS Event
- Seat Occupied Status
- Seat Belt Status
- Master Optical Warning Device Switch Position
- Service Brake
- Engine Hours
- Time
- Date

Each portion of the data shall be recorded at the specified intervals and stored for the specified length of time to meet NFPA 1901 guidelines and shall be retrievable by connecting a laptop computer to the VDR system. The laptop connection shall be a panel mounted female type B USB connection point, remotely mounted in the left side foot well of the cab.

34. ACCESSORY POWER

A 40-amp battery direct power and ground stud shall be provided and installed in the electrical distribution panel. The stud shall be size #10 and protected with a 40-amp circuit breaker. A 225-amp battery direct power and ground stud shall be provided and installed on the chassis near the left hand battery box for OEM body connections.

35. EXTERIOR ELECTRICAL TERMINAL COATING

All terminals exposed to the elements will be sprayed with a high visibility protective rubberized coating to prevent corrosion.

36. ENGINE

The chassis engine shall be a Cummins ISL9 engine. The ISL9 engine shall be an in-line six (6) cylinder, four (4) cycle diesel powered engine. The engine shall offer a rating of 450 horse power at 2100 RPM and shall be governed at 2200 RPM. The torque rating shall feature 1250 foot pounds of torque at 1400 RPM with 543 cubic inches (8.9 liters) of displacement.

The ISL9 engine shall feature a VGT™ Turbocharger, a high pressure common rail fuel system, fully integrated electronic controls with an electronic governor, and shall be EPA certified to meet the 2013 emissions standards using cooled exhaust gas recirculation and selective catalytic reduction technology.

The engine shall include an engine mounted combination full flow/by-pass oil filter with replaceable spin on cartridge for use with the engine lubrication system. The engine shall include Citgo brand Citgard 500, or equivalent SAE 15W40 CJ4 low ash engine oil which shall be utilized for proper engine lubrication.

A wiring harness shall be supplied ending at the back of the cab. The harness shall include a connector which shall allow an optional harness for the pump panel. The included circuits shall be provided for a tachometer, oil pressure, engine temperature, hand throttle, high idle and a PSG system. A circuit for J1939 data link shall also be provided at the back of the cab.

37. CAB ENGINE TUNNEL

The cab interior shall include an integrated engine tunnel constructed of 5052-H32 Marine Grade, 0.19 of an inch thick aluminum. The tunnel shall be a maximum of 41.50 inches wide X 25.50 inches high.

38. DIESEL PARTICULATE FILTER CONTROLS

There shall be two (2) controls for the diesel particulate filter. One (1) control shall be for regeneration and one (1) control shall be for regeneration inhibit.

39. ENGINE PROGRAMMING HIGH IDLE SPEED

The engine high idle control shall maintain the engine idle at approximately 1250 RPM when engaged.

40. ENGINE HIGH IDLE CONTROL

The vehicle shall be equipped with a high-idle speed control rocker switch, which shall be pre-set to maintain the engine idle at a pre-determined rate when activated manually. This device shall operate when the master switch is activated and safely interlocked only to function when the transmission is in neutral with the parking brake set.

41. ENGINE PROGRAMMING ROAD SPEED GOVERNOR

The engine shall include programming which will govern the top speed of the vehicle.

42. AUXILIARY ENGINE BRAKE

The engine shall utilize a variable geometry turbo (VGT). The VGT auxiliary engine brake shall be an integral part of the turbo and shall offer a variable rate of exhaust flow, which when activated shall slow the engine and in turn slow the vehicle.

The VGT shall actuate the vehicle's brake lights when engaged as an auxiliary brake. A cutout relay shall be installed to disable the VGT when in pump mode or when an ABS event occurs. The VGT engine brake shall activate at a 0% accelerator throttle position when in operation mode.

43. AUXILIARY ENGINE BRAKE CONTROL

An engine variable geometry turbo brake control device shall be included. The electronic control device shall monitor various conditions and shall activate the engine brake only if all of the following conditions are simultaneously detected:

- A valid gear ratio is detected
- The driver has requested or enabled engine compression brake operation
- The throttle is at a minimum engine speed position
- The electronic controller is not presently attempting to execute an electronically controlled final drive gear shift

The variable geometry turbo brake control shall be controlled through an on/off rocker switch.

44. ELECTRONIC ENGINE OIL LEVEL INDICATOR

The engine oil shall be monitored electronically and shall send a signal to activate a warning in the instrument panel when levels fall below normal. The warning shall activate in a low oil situation upon turning on the master battery and ignition switches without the engine running.

45. FLUID FILLS

The front of the chassis shall accommodate fluid fill for the engine oil through the grille. This area shall also accommodate a check for the engine oil. The transmission, power steering, and coolant fluid fills and checks shall be under the cab. The windshield washer fill shall be accessible through the front left side mid step.

46. ENGINE WARRANTY

The Cummins engine shall be warranted for a period of five (5) years or 100,000 miles, whichever occurs first.

47. REMOTE THROTTLE HARNESS

An apparatus interface wiring harness for the engine and transmission pump interlocks shall be supplied with the chassis. The harness shall include a connector for connection to a chassis pump panel harness supplied by the body builder and shall terminate in the left frame rail behind the cab for connection by the body builder. The harness shall include circuits deemed for a pump panel and shall contain circuits for a hand throttle, and a multiplexed gauge. Separate circuits shall also be included for a pump control switch, "Pump Engaged" and "OK to Pump" indicator lights, open compartment ground, start signal, park brake ground, ignition signal, master power, clean power, customer ignition, air horn solenoid switch, high idle switch and high idle indicator light. The harness shall contain interlocks that will prevent shifting to road or pump mode unless the transmission output speed translates to less than one (1) mile per hour and the transmission is in neutral. The shift to pump mode shall also require the park brake be set.

48. ENGINE PROGRAMMING REMOTE THROTTLE

The engine ECM (Electronic Control Module) discreet wire remote throttle circuit shall be turned off for use with a J1939 based pump controller or when the discreet wire remote throttle controls are not required.

49. ENGINE PROGRAMMING IDLE SPEED

The engine low idle speed will be programmed at 700 RPM.

50. ENGINE FAN DRIVE

The engine cooling system fan shall incorporate a thermostatically controlled, Horton clutched type fan drive. The clutch fan shall automatically engage in pump mode.

When the clutched fan is disengaged it shall facilitate improved vehicle performance, cab heating in cold climates, and fuel economy. The fan clutch design shall be fail safe so that if the clutch drive fails the fan shall engage to prevent engine overheating due to the fan clutch failure.

51. ENGINE COOLING SYSTEM

There shall be a heavy-duty aluminum cooling system designed to meet the demands of the emergency response industry. The cooling system shall have the capacity to keep the engine properly cooled under all conditions of road and pumping operations. The cooling system shall be designed and tested to meet or exceed the requirements specified by the engine and transmission manufacturer and all EPA requirements. The complete cooling system shall be mounted to isolate the entire system from vibration or stress. The individual cores of the cooling system shall be mounted in a manner to allow expansion and contraction at various rates without inducing stress into the adjoining cores.

The cooling system shall utilize a charge air cooler to radiator serial flow package that provides the maximum cooling capacity for the specified engine as well as serviceability. The main components shall include a surge tank; an air to air charge air cooler bolted to the front of the radiator, recirculation shields, a shroud, a fan, and required tubing.

The radiator shall be a down-flow design constructed with aluminum cores, plastic end tanks, and a steel frame. The radiator shall be equipped with a drain cock to drain the coolant for serviceability.

The cooling system shall include a one piece injection molded polymer eleven (11) blade fan with a fiberglass fan shroud.

The cooling system shall be equipped with a surge tank that is capable of removing entrained air from the system. The surge tank shall be equipped with a low coolant probe and sight glass to monitor the level of the coolant. The surge tank shall have a dual seal cap that meets the engine manufacturer's pressure requirements, and allows for expansion and recovery of coolant into a separate integral expansion chamber.

All radiator tubes shall be formed from aluminized steel tubing. Recirculation shields shall be installed where required to prevent heated air from reentering the cooling package and affecting performance.

The charge air cooler shall be a cross-flow design constructed completely of aluminum with cast tanks. All charge air cooler tubes shall be formed from aluminized steel tubing and installed with silicone hump hoses and stainless steel "constant torque" style clamps meeting the engine manufacturer's requirements.

52. ENGINE COOLING SYSTEM PROTECTION

The engine cooling system shall include a recirculation shield designed to act as a light duty skid plate below the radiator to provide additional protection for the engine cooling system from light impacts, stones, and road debris. The skid plate shall be painted to match the frame color.

53. ENGINE COOLANT

The cooling package shall include Extended Life Coolant (ELC). The use of ELC provides longer intervals between coolant changes over standard coolants providing improved performance. The coolant shall contain a 50/50 mix of ethylene glycol and de-ionized water to keep the coolant from freezing to a temperature of -34 degrees Fahrenheit.

Proposals offering supplemental coolant additives (SCA) shall not be considered, as this is part of the extended life coolant makeup.

54. **ELECTRONIC COOLANT LEVEL INDICATOR**

The instrument panel shall feature a low engine coolant indicator light which shall be located in the center of the instrument panel. An audible tone alarm shall also be provided to warn of a low coolant incident.

55. ENGINE PUMP HEAT EXCHANGER

A single bundle type coolant to water heat exchanger shall be installed between the engine and the radiator. The heat exchanger shall be designed to prohibit water from the pump from coming in contact with the engine coolant. This shall allow the use of water from the discharge side of the pump to assist in cooling the engine.

56. COOLANT HOSES

The cooling system hoses shall be silicone heater hose with rubber hoses in the cab interior. The radiator hoses shall be formed silicone coolant hoses with formed aluminized steel tubing. All heater hose, silicone coolant hose, and tubing shall be secured with stainless steel constant torque band clamps.

57. ENGINE AIR INTAKE

The engine air intake system shall include an ember separator air intake filter which shall be located behind the right hand side headlamp. This filter ember separator shall be designed to protect the downstream air filter from embers, using a combination of unique flat and crimped metal screens packaged in a corrosion resistant heavy duty galvanized steel frame. This multilayered screen shall be design traps embers and allows them to burn out before passing through the pack.

The engine air intake system shall also include a stainless steel air cleaner mounted to the frame and located beneath the cab on the right side of the vehicle. The air cleaner shall utilize a replaceable filter element designed to prevent dust and debris from being ingested into the engine. The air cleaner housing and connections in the air intake system shall be designed to mitigate water intrusion into the system during severe weather conditions.

The air intake system shall also include a restriction indicator light in the warning light cluster on the instrument panel, which shall activate when the air cleaner element requires replacement.

58. AIR INTAKE PROTECTION

A light duty skid plate shall be supplied for the engine air intake system below the right front side of the cab. The skid plate shall provide protection for the air intake system from light impacts, stones, and road debris. The skid plate shall be painted to match the frame color.

59. ENGINE EXHAUST SYSTEM

The exhaust system shall be mounted below the frame in the outboard position with the SCR canister in line rearward of the DPF. The exhaust system shall utilize a 90-degree bend in the exhaust tubing from the turbo into a side inlet DPF canister that allows the entire system to be pulled forward. The discharge shall terminate horizontally on the right side of the vehicle ahead of the rear tires.

The exhaust system shall include a diesel particulate filter (DPF), a diesel oxidation catalyst, and a selective catalytic reduction (SCR) catalyst to meet current EPA standards. The selective catalytic reduction catalyst utilizes a diesel exhaust fluid solution consisting of urea and purified water to convert NOx into nitrogen, water, and trace amounts of carbon dioxide. The solution shall be injected into the system through the decomposition tube between the DPF and SCR.

The system shall utilize 0.07 inch thick stainless steel exhaust tubing between the engine turbo and the DPF. Zero leak clamps seal all system joints between the turbo and DPF.

The DPF, the decomposition tube, and the SCR canister through the end of the tailpipe shall be connected with zero leak clamps.

60. DIESEL EXHAUST FLUID TANK

The exhaust system shall include a molded cross linked polyethylene tank for Diesel Exhaust Fluid (DEF). The tank shall have a capacity of six (6) usable gallons and shall be mounted on the left hand side of the chassis frame behind the batteries below the frame.

The DEF tank shall be designed with capacity for expansion in case of fluid freezing. Engine coolant, which shall be thermostatically controlled, shall be run through lines in the tank to help prevent the DEF from freezing and to provide a means of thawing the fluid if it should become frozen.

The tank fill tube shall be routed under the rear of the cab with the fill neck and splash guard accessible in the top rear step.

61. ENGINE EXHAUST ACCESSORIES

An exhaust temperature mitigation device shall be shipped loose for installation by the body manufacturer on the vehicle. The temperature mitigation device shall lower the temperature of the exhaust by combining ambient air with the exhaust gasses at the exhaust outlet.

62. ENGINE EXHAUST WRAP

The exhaust tubing between the engine turbo and the diesel particulate filter (DPF) shall be wrapped with a thermal cover in order to retain the necessary heat for DPF regeneration. The exhaust wrap shall also help protect surrounding components from radiant heat which can be transferred from the exhaust.

63. TRANSMISSION

The drive train shall include an Allison model EVS 3000 torque converting, automatic transmission which shall include electronic controls. The transmission shall feature two (2) 10-bolt PTO pads located on the converter housing.

The transmission shall include two (2) internal oil filters and Castrol TranSynd™ synthetic TES 295 transmission fluid which shall be utilized in the lubrication of the EVS transmission. An electronic oil level sensor shall be included with the readout located in the shift selector.

The transmission gear ratios shall be:

1st	3.49:1
2nd	1.86:1
3rd	1.41:1
4th	1.00:1
5th	0.75:1
6th	0.65:1
Rev	5.03:1

65. TRANSMISSION MODE PROGRAMMING

The transmission, upon start-up, will select five (5) speeds of operation. The sixth speed over drive shall be available with the activation of the mode button on the shifting pad.

66. TRANSMISSION FEATURE PROGRAMMING

The Allison Gen V-E transmission EVS group package number 127 shall contain the 198 vocational packages in consideration of the duty of this apparatus as a pumper. This package shall incorporate an automatic neutral with selector override. This feature commands the transmission to neutral when the park brake is applied, regardless of drive range requested on the shift selector. This requires re-selecting drive range to shift out of neutral for the override.

This package shall be coupled with the use of a split shaft PTO and incorporate pumping circuits. These circuits shall be used allowing the vehicle to operate in the fourth range lockup while operating the pump mode due to the one (1) to one (1) ratio through the transmission, therefore the output speed of the engine is the input speed to the pump. The pump output can be easily calculated by using this input speed and the drive ratio of the pump itself to rate the gallons of water the pump can provide.

A transmission interface connector shall be provided in the cab. This package shall contain the following input/output circuits to the transmission control module. The Gen V-E transmission shall include prognostic diagnostic capabilities. These capabilities shall include the monitoring of the fluid life, filter change indication, and transmission clutch maintenance.

Function ID	Description	Wire assignment
Inputs		
C	PTO Request	142
J	Fire Truck Pump Mode (4th Lockup)	122 / 123
Outputs		
C	Range Indicator	145 (4th)
G	PTO Enable Output	130
	Signal Return	103

66. ELECTRONIC TRANSMISSION OIL LEVEL INDICATOR

The transmission fluid shall be monitored electronically and shall send a signal to activate a warning in the instrument panel when levels fall below normal.

67. TRANSMISSION SHIFT SELECTOR

An Allison pressure sensitive range selector touch pad shall be provided and located to the right of the driver within clear view and easy reach. The shift selector shall have a graphical Vacuum Florescent Display (VFD) capable of displaying two lines of text. The shift selector shall provide mode indication and a prognostic indicator (wrench symbol) on the digital display. The prognostics monitor various operating parameters and shall alert you when a specific maintenance function is required.

68. TRANSMISSION PRE-SELECT WITH AUXILIARY BRAKE

When the auxiliary brake is engaged, the transmission shall automatically shift to second gear to decrease the rate of speed assisting the secondary braking system and slowing the vehicle.

69. TRANSMISSION COOLING SYSTEM

The transmission shall include water to oil cooler system located in the cooling loop between the radiator and the engine. The transmission cooling system shall meet all transmission manufacturer requirements. The transmission cooling system shall feature continuous flow of engine bypass water to maintain uninterrupted transmission cooling.

70. TRANSMISSION WARRANTY

The Allison EVS series transmission shall be warranted for a period of five (5) years with unlimited mileage. Parts and labor shall be included in the warranty.

71. PTO LOCATION

The transmission shall have two (2) power take off (PTO) mounting locations, one (1) in the 8:00 o'clock position and one (1) in the 4:00 o'clock position.

72. DRIVELINE

All drivelines shall be heavy duty metal tube and equipped with Spicer 1710 series universal joints. The shafts shall be dynamically balanced prior to installation to alleviate future vibration. In areas of the driveline where a slip shaft is required, the splined slip joint shall be coated with Glide Coat®.

73. FUEL FILTER/WATER SEPARATOR

The fuel system shall have a Fleetguard FS1003 fuel filter/water separator as a primary filter. The fuel filter shall have a drain valve.

Water in fuel sensor shall be provided and wired to an instrument panel lamp and audible alarm to indicate when water is present in the fuel/water separator.

A secondary fuel filter shall be included as approved by the engine manufacturer.

74. FUEL LINES

The fuel system supply and return lines installed from the fuel tank to the engine shall be reinforced nylon tubing rated for diesel fuel. The fuel lines shall be brown in color and connected with brass fittings.

75. ELECTRIC FUEL PRIMER

Integral to the engine assembly is an electric lift pump that serves the purpose of pre-filter fuel priming.

76. FUEL TANK

The fuel tank shall have a min. capacity of fifty (50) gallons and shall measure 35.00 inches in width X 15.00 inches in height X 24.00 inches in length.

The baffled tank shall have a vent port to facilitate venting to the top of the fill neck for rapid filling without "blow-back" and a roll over ball check vent for temperature related fuel expansion and draw.

The tank is designed with dual draw tubes and sender flanges. The tank shall have 2.00 inch NPT fill ports for right or left hand fill. A 0.50 inch NPT drain plug shall be centered in the bottom of the tank.

The fuel tank shall be mounted below the frame, behind the rear axle. Two (2) three-piece strap hanger assemblies with "U" straps bolted midway on the fuel tank front and rear shall be utilized to allow the tank to be easily lowered and removed for service purposes. Rubber isolating pads shall be provided

between the tank and the upper tank mounting brackets. Strap mounting studs through the rail, hidden behind the body shall not be acceptable.

77. FUEL TANK MATERIAL AND FINISH

The fuel tank shall be constructed of 12 gauge aluminized steel. The exterior of the tank shall be powder coated black and then painted to match the frame color.

All powder coatings, primers and paint shall be compatible with all metals, pretreatments and primers used. The cross hatch adhesion test per ASTM D3359 Method B, results to be 5B minimum. The pencil hardness test per ASTM D3363 shall have a final post-curved pencil hardness of H-2H. The direct impact resistance test per ASTM D2794, results to be 5B minimum.

Any proposals offering painted fuel tanks with variations from the above process shall not be accepted. The film thickness of vendor supplied parts shall also be sufficient to meet the performance standards as stated above.

78. FUEL TANK STRAP MATERIAL

The fuel tank straps shall be constructed of ASTM A-36 steel.

79. FUEL TANK FILL PORT

The fuel tank fill ports shall be offset with the left fill port located in the middle position and the right fill port located in the forward position of the fuel tank.

A 1.50 inch diameter hole shall be provided in the left and right frame rails for vent hose routing provisions. The holes shall be located adjacent to the fuel tank and 5.13 inches up from the bottom of each rail.

80. FUEL TANK SERVICEABILITY PROVISIONS

The chassis fuel lines shall have additional length provided so the tank can be easily lowered and removed for service purposes. The additional 8.00 feet of length shall be located above the fuel tank and shall be coiled and secured. The fuel line fittings shall be pointed towards the right side (curbside) of the chassis.

81. FUEL TANK DRAIN PLUG

A 0.5 inch NPT drain plug shall be centered in the bottom of the fuel tank.

82. FRONT AXLE

The front axle shall be a Meritor Easy Steer Non drive front axle, model number MFS-18. The axle shall include a 3.74 inch drop and a 71.00 inch king pin intersection (KPI). The axle shall include a conventional style hub with a standard knuckle. The weight capacity for the axle shall be rated to 18,000 pounds.

83. FRONT AXLE WARRANTY

The front axle shall be warranted by Meritor for two (2) years with unlimited miles under the general service application. Details of the Meritor warranty are provided on the PDF document attached to this option.

84. FRONT WHEEL BEARING LUBRICATION

The front axle wheel bearings shall be lubricated with oil. The oil level can be visually checked via clear inspection windows in the front axle hubs.

85. FRONT SHOCK ABSORBERS

Two (2) Bilstein inert, nitrogen gas filled shock absorbers shall be provided and installed as part of the front suspension system. The shocks shall be a monotubular design and fabricated using a special extrusion method, utilizing a single blank of steel without a welded seam, achieving an extremely tight peak-to-valley tolerance and maintains consistent wall thickness. The monotubular design shall provide superior strength while maximizing heat dissipation and shock life.

The ride afforded through the use of a gas shock is more consistent and shall not deteriorate with heat, the same way a conventional oil filled hydraulic shock would.

The Bilstein front shocks shall include a digressive working piston assembly allowing independent tuning of the compression and rebound damping forces to provide optimum ride and comfort without compromise. The working piston design shall feature fewer parts than most conventional twin tube and "road sensing" shock designs and shall contribute to the durability and long life of the Bilstein shock absorbers.

Proposals offering the use of conventional twin tube or "road sensing" designed shocks shall not be considered.

86. FRONT SUSPENSION

The front suspension shall include a four (4) leaf spring pack consisting of 54.00 inch long and 4.00 inch wide taper leaf springs and shall feature a military double wrapped front eye. Both spring eyes shall have a case hardened threaded bushing installed with lubrication counter bore and lubrication land off cross bore with grease fitting. The spring capacity shall be rated at 18,000 pounds.

87. STEERING COLUMN/WHEEL

The cab shall include a Douglas Autotech steering column which shall include a seven (7) position tilt, a 2.25 inch telescopic adjustment, and an 18.00 inch, four (4) spoke steering wheels located at the driver's position. The steering wheel shall be covered with black polyurethane foam padding.

The steering column shall contain a horn button, self-canceling turn signal switch, four-way hazard switch and headlamp dimmer switch.

88. ELECTRONIC POWER STEERING FLUID LEVEL INDICATOR

The power steering fluid shall be monitored electronically and shall send a signal to activate an audible alarm and visual warning in the instrument panel when fluid level falls below normal.

89. POWER STEERING PUMP

The hydraulic power steering pump shall be a TRW PS and shall be gear driven from the engine. The pump shall be a balanced, positive displacement, sliding vane type.

90. FRONT AXLE CRAMP ANGLE

The chassis shall have a front axle cramp angle of 50-degrees to the left and right.

91. POWER STEERING GEAR

The power steering gear shall be a TRW model TAS 85.

92. CHASSIS ALIGNMENT

The chassis frame rails shall be measured to insure the length is correct and cross checked to make sure they run parallel and are square to each other. The front and rear axles shall be laser aligned. The front tires and wheels shall be aligned and toe-in set on the front tires by the chassis manufacturer.

93. REAR AXLE

The rear axle shall be a Meritor model RS-24-160 single drive axle. The axle shall include precision forged, single reduction differential gearing, and shall have a rated capacity of 24,000 pounds.

The axle shall be built of superior construction and quality components to provide the rugged dependability needed to stand up to the fire industry's demands. The axle shall include rectangular shaped, hot-formed housing with a standard wall thickness of 0.50 of an inch for extra strength and rigidity and a rigid differential case for high axle strength and reduced maintenance.

The axle shall have heavy-duty Hypoid gearing for longer life, greater strength and quieter operation. Industry-standard wheel ends for compatibility with both disc and drum brakes, and unitized oil seal technology to keep lubricant in and help prevent contaminant damage will be used.

94. REAR AXLE WARRANTY

The rear axle shall be warranted by Meritor for two (2) years with unlimited miles under the general service application. Details of the Meritor warranty are provided on the PDF document attached to this option.

95. REAR AXLE DIFFERENTIAL LUBRICATION

The rear axle differential shall be lubricated with oil.

96. REAR WHEEL BEARING LUBRICATION

The rear axle wheel bearings shall be lubricated with oil.

97. VEHICLE TOP SPEED

The governed speed of the vehicle shall be approximately 109 km +/-2 km with room to increase to 120 km if necessary later.

98. REAR SUSPENSION

The single rear axle shall feature a Reyco 79KB vari-rate, self-leveling captive slipper type conventional multi-leaf spring suspension, with 57.50 inch X 3.00 inch springs. One (1) adjustable and one (1) fixed torque rod shall be provided.

The rear suspension capacity shall be rated from 21,000 to 31,500 pounds.

99. FRONT TIRES

The front tires shall be Michelin 385/65R-22.5 18PR "J" tubeless radial XZY3 mixed service tread.

The front tire stamped load capacity shall be 18,740 pounds per axle with a nominal speed rating of 65 mph when properly inflated to 120 psi.

The Michelin Intermittent Service Rating maximum load capacity shall be 20,052 pounds per axle with a maximum speed of 65 mph when properly inflated to 120 psi.

The Michelin Intermittent Service Rating maximum speed capacity shall be 18,740 pounds per axle with a speed rating of 75 mph when properly inflated to 120 psi.

The Michelin Intermittent Service Rating limits the operation of the emergency vehicle to no more than fifty (50) miles of continuous operation under maximum recommended payload, or without stopping for at least twenty (20) minutes. The emergency vehicle must reduce its speed to no more than 50 mph after the first fifty (50) miles of travel.

100. REAR TIRES

The rear tires shall be Michelin 12R-22.5 16PR "H" tubeless radial XDN2 all-weather tread.

The rear tire stamped load capacity shall be 27,120 pounds per axle with a nominal speed rating of 75 mph when properly inflated to 120 psi.

The Michelin Intermittent Service Rating maximum load capacity shall be 29,020 pounds per axle with a maximum speed of 75 mph when properly inflated to 120 psi.

The Michelin Intermittent Service Rating maximum speed capacity shall match the nominal speed rating.

The Michelin Intermittent Service Rating limits the operation of the emergency vehicle to no more than fifty (50) miles of continuous operation under maximum recommended payload, or without stopping for at least twenty (20) minutes. The emergency vehicle must reduce its speed to no more than 50 mph after the first fifty (50) miles of travel.

101. REAR AXLE RATIO

The rear axle ratio shall be 5.63:1.

102. TIRE PRESSURE INDICATOR

There shall be a voucher provided with the chassis for a dial style tire pressure indicator at the front tire valve stem and a pop up style tire pressure indicator at the rear tire valve stem. The indicator shall provide visual indication of pressure in the specific tire.

The tire pressure indicators shall be redeemed upon the vehicle manufacturer's receipt of the voucher for installation by the customer.

103. FRONT WHEELS

The front wheels shall be Alcoa hub piloted, 22.50 inch X 12.25 inch LvL One™ polished aluminum wheels. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts. The wheels shall feature one-piece forged strength and a polished finish that lasts.

104. REAR WHEELS

The outer rear wheels shall be Alcoa hub piloted, 22.50 inch X 8.25 inch LvL One™ aluminum wheels with a polished outer surface. The inner rear wheels shall be Alcoa hub piloted, 22.50 inch X 8.25 inch aluminum wheels with LvL One™ bright machine finish. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts.

105. BRAKE SYSTEM

A rapid build-up air brake system shall be provided. The air brakes shall include a two (2) air tank, three (3) reservoir system with a total of 4152 cubic inch of air capacity. A floor mounted treadle valve shall be mounted inside the cab for graduated control of applying and releasing the brakes. An inversion valve shall be installed to provide a controlled service brake application during an unlikely event including primary air supply loss. All air reservoirs provided on the chassis shall be labeled for identification.

The rear axle spring brakes shall automatically apply in any situation when the air pressure falls below 25 PSI and shall include a mechanical means for releasing the spring brakes when necessary. An audible alarm shall designate when the system air pressure is below 60 PSI.

A four (4) sensor, four (4) modulator Anti-lock Braking System (ABS) shall be installed on the front and rear axles in order to prevent the brakes from locking or skidding while braking during hard stops or on icy or wet surfaces. This in turn shall allow the driver to maintain steering control under heavy braking and in most instances, shorten the braking distance. The electronic monitoring system shall incorporate diagonal circuitry which shall monitor wheel speed during braking through a sensor and tone ring on each wheel. A dash mounted ABS lamp shall be provided to notify the driver of a system malfunction. The ABS system shall automatically disengage the auxiliary braking system device when required. The speedometer screen shall be capable of reporting all active defaults using PID/SID and FMI standards.

106. FRONT BRAKES

The front brakes shall be Meritor 16.50 inch x 6.00 inch S-cam drum type.

107. REAR BRAKES

The rear brakes shall be Meritor 16.50 inch X 7.00 inch S-cam drum type.

108. PARK BRAKE

Upon application of the push-pull valve in the cab, the rear brakes will engage via mechanical spring force. This is accomplished by dual chamber rear brakes, satisfying the FMVSS parking brake requirements.

109. PARK BRAKE CONTROL

A Meritor-Wabco manual hand control push-pull style valve shall operate the parking brake system. The control shall be yellow in color.

The parking brake actuation valve shall be mounted to the left side of the engine tunnel integrated into the mirror control pod console within easy access of the driver.

110. FRONT BRAKE SLACK ADJUSTERS

The front brakes shall include Meritor automatic slack adjusters installed on the chassis which features a simple, durable design offering reduced weight. The automatic slack adjusters shall feature a manual adjusting nut which cannot inadvertently be backed off and threaded grease fittings for easy serviceability.

111. REAR BRAKE SLACK ADJUSTERS

The rear brakes shall include Meritor automatic slack adjusters installed on the axle which features a simple, durable design offering reduced weight. The automatic slack adjusters shall feature a manual

adjusting nut which cannot inadvertently be backed off and threaded grease fittings for easy serviceability.

112. FRONT BRAKE DUST SHIELDS

The front axle shall be equipped with brake dust shields.

113. REAR BRAKE DUST SHIELDS

The rear brakes shall be equipped with brake dust shields.

114. AIR DRYER

The brake system shall include a Wabco System Saver 1200 air dryer with an integral heater with a Metri-Pack sealed connector. The air dryer incorporates an internal turbo cutoff valve that closes the path between the air compressor and air dryer purge valve during the compressor "unload" cycle. The turbo cutoff valve allows purging of moisture and contaminants without the loss of turbo boost pressure. The air dryer shall be mounted behind the battery box on the left hand side.

115. FRONT BRAKE CHAMBERS

The front brakes shall be provided with MGM type 30 brake chambers.

116. REAR BRAKE CHAMBERS

The rear axle shall include TSE 30/30 brake chambers which shall convert the energy of compressed air into mechanical force and motion. This shall actuate the brake camshaft, which in turn shall operate the foundational brake mechanism forcing the brake shoes against the brake drum. The TSE Type 30 brake chamber shall offer a 30.00 square inch effective area.

117. AIR COMPRESSOR

The air compressor provided for the engine shall be a Wabco® SS318 single cylinder pass-through drive type compressor which shall be capable of producing 18.7 CFM at 1200 engine RPMs. The air compressor shall feature a higher efficiency, translating to more air delivery per horsepower absorbed. The compressor shall include an aluminum cylinder head which shall improve cooling, reduce weight and decrease carbon formation. Superior piston and bore finishing technology shall reduce oil consumption and significantly increasing the system component life.

118. AIR GOVERNOR

An air governor shall be provided to control the cut-in and cut-out pressures of the engine mounted air compressor. The governor shall be calibrated to meet FMVSS requirements. The air governor shall be located on the air dryer bracket on the left frame rail behind the battery box.

119. MOISTURE EJECTORS

Manual Class 1 1/4 turn type drain valves shall be installed on all reservoirs of the air supply system. The drain valves will be extended to the body side with independent air lines. An automatic moisture ejector will be installed on the wet tank of the air supply system in addition to the 1/4 turn valve.

120. AIR SUPPLY LINES

The air system on the chassis shall be plumbed with color coded reinforced nylon tubing air lines. The primary (rear) brake line shall be green, the secondary (front) brake line red, the parking brake line orange and the auxiliary (outlet) will be blue.

Brass compression type fittings shall be used on the nylon tubing. All drop hoses shall include fiber reinforced neoprene covered hoses.

121. WHEELBASE

The chassis wheelbase shall be 185.00 inches.

122. REAR OVERHANG

The chassis rear overhang shall be a maximum 90.00 inches.

123. FRAME

The frame shall consist of double rails running parallel to each other with cross members forming a ladder style frame. The frame rails shall be formed in the shape of a "C" channel, with the outer rail measuring 10.25 inches high X 3.50 inches deep upper and lower flanges X 0.38 inches thick with an inner channel of 9.44 inches high X 3.13 inches deep and 0.38 inches thick. Each rail shall be constructed of 110,000 psi minimum yield high strength low alloy steel. Each double rail section shall be rated by a Resistance Bending Moment (RBM) minimum of 3,213,100 inch pounds and have a minimum section modulus of 29.21 cubic inches. The frame shall measure 35.00 inches in width.

Proposals calculating the frame strength using the “box method” shall not be considered.

Proposals including heat treated rails shall not be considered. Heat treating frame rails produces rails that are not uniform in their mechanical properties throughout the length of the rail. Rails made of high strength, low alloy steel are already at the required yield strength prior to forming the rail.

A minimum of seven (7) fully gusseted 0.25 inch thick cross members shall be installed. The inclusion of the body mounting, or bumper mounting shall not be considered as a cross member. The cross members shall be attached using zinc coated grade 8 fasteners. The bolt heads shall be flanged type, held in place by distorted thread flanged lock nuts. Each cross member shall be mounted to the frame rails utilizing a minimum of 0.25 inch thick gusset reinforcement plates at all corners balancing the area of force throughout the entire frame.

Any proposals not including additional reinforcement for each cross member shall not be considered.

All relief areas shall be cut in with a minimum 2.00 inch radius at intersection points with the edges ground to a smooth finish to prevent a stress concentration point.

The frame and cross members shall carry a lifetime warranty to the original purchaser. A copy of the frame warranty shall be made available upon request.

Proposals offering warranties for frames not including cross members shall not be considered.

124. MISCELLANEOUS FRAME OPTIONS

The cross members following the transmission, throughout the length of the frame shall be inverted where clearance allows.

125. FRAME WARRANTY

The frame and cross members shall carry a limited lifetime warranty to the original purchaser. The warranty period shall commence on the date the vehicle is delivered to the first end user.

126. FRAME PAINT

The frame shall be powder coated black prior to any attachment of components.

All powder coatings, primers and paint shall be compatible with all metals, pretreatments and primers used. The cross hatch adhesion test per ASTM D3359 shall not have a fail of more than ten (10) squares. The pencil hardness test per ASTM D3363 shall have a final post-curved pencil hardness of H-2H. The direct impact resistance test per ASTM D2794 shall have an impact resistance of 120.00 inches per pound at 2 mils.

Any proposals offering painted frame with variations from the above process shall not be accepted. The film thickness of vendor supplied parts shall also be sufficient to meet the performance standards as stated above.

127. FRONT BUMPER

A one piece, two (2) rib wrap-around style, polished stainless steel front bumper shall be provided. The material shall be 10 gauge 304 stainless steel, 12.00 inches high and 99.00 inches wide.

128. FRONT BUMPER EXTENSION LENGTH

The front bumper shall be extended approximately 14.00 inches ahead of the cab.

129. FRONT BUMPER APRON

The 14.00 inch extended front bumper shall include an apron constructed of 0.19 inch thick embossed aluminum tread plate.

The apron shall be installed between the bumper and the front face of the cab affixed using stainless steel bolts attaching the apron to the top bumper flange.

130. AIR HORN

The front bumper shall include two (2) Hadley brand E-Tone air horns which shall measure 21.00 inches long with a 6.00 inch round flare. The air horns shall be trumpet style with a chrome finish on the exterior and a painted finish deep inside the trumpet.

131. AIR HORN LOCATION

The air horns shall be recess mounted in the front bumper face on the left side of the bumper in the inboard and outboard positions relative to the left hand frame rail.

132. AIR HORN RESERVOIR

One (1) air reservoir, with a 1200 cubic inch capacity, shall be installed on the chassis to act as a supply tank for operating air horns. The reservoir shall be isolated with a 90 psi pressure protection valve on the reservoir supply side to prevent depletion of the air to the air brake system.

133. ELECTRONIC SIREN SPEAKER

There shall be two (2) Cast Products Inc. model SA4301, 100 watt speakers provided. Each speaker shall measure 6.20 inches tall X 7.36 inches wide X 3.06 inches deep. Each speaker shall include a flat mounting flange which shall be polished aluminum.

134. ELECTRONIC SIREN SPEAKER LOCATION

The electronic siren speakers shall be located on the front bumper face on the right side outboard of the frame rail in the far outboard position.

135. FRONT BUMPER TOW HOOKS

Two (2) heavy duty tow hooks, painted to match the chassis frame, shall be installed in the rearward position out of the approach angle area, bolted directly to the side of each chassis frame rail with grade 8 bolts.

136. CAB TILT SYSTEM

The entire cab shall be capable of tilting approximately 45-degrees to allow for easy maintenance of the engine and transmission. The cab tilt pump assembly shall be located on the right side of the chassis above the battery box.

The electric-over-hydraulic lift system shall include an ignition interlock and red cab lock down indicator lamp on the tilt control which shall illuminate when holding the "Down" button to indicate safe road operation.

It shall be necessary to activate the master battery switch and set the parking brake in order to tilt the cab. As a third precaution the ignition switch must be turned off to complete the cab tilt interlock safety circuit.

Two (2) spring-loaded hydraulic hold down hooks located outboard of the frame shall be installed to hold the cab securely to the frame. Once the hold-down hooks are set in place, it shall take the application of pressure from the hydraulic cab tilt lift pump to release the hooks.

Two (2) cab tilt cylinders shall be provided with velocity fuses in each cylinder port. The cab tilt pivots shall be 1.90 inch ball and be anchored to frame brackets with 1.25 inch diameter studs.

A steel safety channel assembly shall be installed on the right side cab lift cylinder to prevent accidental cab lowering. The safety channel assembly shall fall over the lift cylinder when the cab is in the fully tilted position. A cable release system shall also be provided to retract the safety channel assembly from the lift cylinder to allow the lowering of the cab.

137. CAB TILT CONTROL RECEPTACLE

A six (6) pin Deutsch receptacle that includes a cap shall be installed in the front bumper tail on the right hand side to provide a place to plug in the cab tilt remote control pendant.

The remote control pendant shall include 20.00 feet of cable with a mating Deutsch connector. The remote control pendant shall be shipped loose with the chassis.

138. CAB WINDSHIELD

The cab windshield shall have a surface area of 2825.00 square inches and be of a two (2) piece wraparound design for maximum visibility.

The glass utilized for the windshield shall include standard automotive tint. The left and right windshield shall be fully interchangeable thereby minimizing stocking and replacement costs.

Each windshield shall be installed using black self-locking window rubber.

139. GLASS FRONT DOOR

The front cab doors shall include a window which is 27.00 inches in width X 26.00 inches in height. These windows shall have the capability to roll down completely into the door housing. This shall be accomplished manually utilizing a crank style handle on the inside of the door. A reinforced window regulator assembly shall be provided for severe duty use.

There shall be an irregular shaped fixed window which shall measure 2.50 inches wide at the top, 8.00 inches wide at the bottom X 26.00 inches in height, more commonly known as "cozy glass" ahead of the front door roll down windows.

The windows shall be mounted within the frame of the front doors trimmed with a black anodized ring on the exterior.

140. GLASS TINT FRONT DOOR

The windows located in the left and right front doors shall have a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

141. GLASS REAR DOOR RIGHT HAND

The rear right hand side door shall include a window which is 27.00 inches in width X 26.00 inches in height. This window shall roll up and down manually utilizing a crank style handle on the inside of the door. A reinforced window regulator assembly shall be provided for severe duty use.

142. GLASS TINT REAR DOOR RIGHT HAND

The window located in the right hand side rear door shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

143. GLASS REAR DOOR LEFT HAND

The rear left hand side door shall include a window which is 27.00 inches in width X 26.00 inches in height. This window shall roll up and down manually utilizing a crank style handle on the inside of the door. A reinforced window regulator assembly shall be provided for severe duty use.

144. GLASS TINT REAR DOOR LEFT HAND

The window located in the left hand side rear door shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

145. GLASS SIDE MID RIGHT HAND

The cab shall include a window on the right side behind the front and ahead of the crew door which shall measure 16.00 inches wide X 26.00 inches high. This window shall be fixed within this space and shall be rectangular in shape. The window shall be mounted using self-locking window rubber. The glass utilized for this window shall include a green automotive tint unless otherwise noted.

146. GLASS TINT SIDE MID RIGHT HAND

The window located on the right hand side of the cab between the front and rear doors shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

147. GLASS SIDE MID LEFT HAND

The cab shall include a window on the left side behind the front door and ahead of the crew door and above the wheel well which shall measure 16.00 inches wide X 26.00 inches high. This window shall be

fixed within this space and shall be rectangular in shape. The window shall be mounted using self-locking window rubber. The glass utilized for this window shall include a green automotive tint unless otherwise noted.

148. GLASS TINT SIDE MID LEFT HAND

The window located on the left hand side of the cab between the front and rear doors shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

149. CLIMATE CONTROL

The cab shall include a 57,500 BTU @ 425 CFM front overhead heater/defroster which shall be provided and installed above the windshield between the sun visors.

The cab shall also include a combination heater air-conditioning unit mounted on the roof. This unit shall offer eight (8) adjustable louvers, four (4) forward facing and four (4) rearward facing, a temperature control valve and two (2) blowers offering three (3) speeds which shall be capable of circulating 550 cubic feet of air per minute. The unit shall be rated for 42,500 BTU/Hr of cooling and 36,000 BTU/Hr of heating. The temperature and blower controls shall be located on the heater/air conditioning unit.

All defrost/heating systems shall be plumbed with one (1) seasonal shut-off valve at the front corner on the right side of the cab.

The air conditioner lines shall be a mixture of custom bend zinc coated steel fittings and Aero-quip GH 134 flexible hose with Aero-quip EZ clip fittings.

150. CLIMATE CONTROL DRAIN

The climate control system shall include a gravity drain for water management. The gravity drain shall remove condensation from the air conditioning system without additional mechanical assistance.

151. CLIMATE CONTROL ACTIVATION

The heating and defrosting controls shall be located on the front overhead climate control unit. There shall be additional heating and air conditioning controls located on the engine tunnel mounted climate control unit.

152. HEATER HOSE INSULATION

The heater hoses leading from the engine to the cab shall include a foam insulation wrap which runs the length of the hose improving heating in extreme cold climates. The heater hoses which shall be routed inside the cab shall not be insulated.

153. A/C CONDENSER LOCATION

A roof mounted A/C condenser shall be installed centered on the cab forward of the raised roof against the slope rise.

154. A/C COMPRESSOR

The air-conditioning compressor shall be a belt driven, engine mounted compressor. The compressor shall be compatible with R134-a refrigerant.

155. CAB CIRCULATION FANS FRONT

The cab shall include two (2) all metal 6.00 inch air circulation fans installed overhead in the center of the cab rearward of the windshield. Each fan shall be controlled by an individual toggle switch on each

fan. The fans can be used to help defog the windshield or to increase air circulation for passenger comfort.

156. UNDER CAB INSULATION

The underside of the cab tunnel surrounding the engine shall be lined with multi-layer insulation, engineered for application inside diesel engine compartments.

The insulation shall act as a noise barrier, absorbing noise thus keeping the decibel level in the cab well within NFPA recommendations. As an additional benefit, the insulation shall assist in sustaining the desired temperature within the cab interior.

The engine tunnel insulation shall measure approximately 0.75 inch thick including a vertically lapped polyester fiber layer, a 1.0 lb/ft² PVC barrier layer, an open cell foam layer, and a moisture and heat reflective foil facing reinforced with a woven fiberglass layer. The foil surface acts as protection against moisture and other contaminants. The insulation shall meet or exceed FMVSS 302 flammability test.

The insulation shall be cut precisely to fit each section and sealed for additional heat and sound deflection. The insulation shall be held in place by 3 mils of acrylic pressure sensitive adhesive and aluminum pins with hard hat, hold in place fastening heads.

157. INTERIOR TRIM FLOOR

The floor of the cab shall be covered with a multi-layer mat consisting of 0.25 inch thick sound absorbing closed cell foam with a 0.06 inch thick non-slip vinyl surface with a pebble grain finish. The covering shall be held in place by a pressure sensitive adhesive and aluminum trim molding. All exposed seams shall be sealed with silicone caulk matching the color of the floor mat to reduce the chance of moisture and debris retention.

158. INTERIOR TRIM

The cab interior shall include trim on the front ceiling, rear crew ceiling, and the cab walls. It shall be easily removable to assist in maintenance. The trim shall be constructed of insulated vinyl over a hard board backing.

159. REAR WALL INTERIOR TRIM

The rear wall of the cab shall be trimmed with vinyl.

160. HEADER TRIM

The cab interior shall feature header trim above the driver and officer positions constructed of vacuum formed ABS material.

161. TRIM CENTER DASH

The main center dash area shall be constructed of durable vacuum formed ABS composite.

162. TRIM LEFT HAND DASH

The left hand dash shall be a one (1) piece durable vacuum formed ABS composite housing which shall be custom molded for a perfect fit around the instrument panel. The left hand dash shall offer lower vertical surface area to the left and right of the steering column to accommodate control panels.

163. TRIM RIGHT HAND DASH

The right hand dash trim shall consist of a vacuum formed ABS composite module, which contains a glove compartment with a hinged locking door and a Mobile Data Terminal (MDT) provision. The glove compartment size shall be 13.50 inches wide X 6.25 inches high X 5.50 inches deep. The MDT provision shall be provided above the glove compartment.

164. ENGINE TUNNEL TRIM

The cab engine tunnel shall be covered with a multi-layer mat consisting of 0.25 inch closed cell foam with a 0.06 inch thick non-slip vinyl surface with a pebble grain finish. The mat shall be held in place by pressure sensitive adhesive. The engine tunnel mat shall be trimmed with anodized aluminum stair nosing trim for an aesthetically pleasing appearance.

165. POWER POINT DASH MOUNT

The cab shall include two (2) 12 volt lighter type receptacles in the dash to provide a power source for 12 volt electrical equipment. The receptacles shall be wired battery direct.

166. STEP TRIM

Each cab entry door shall include a three step entry. The first step closest to the ground shall be constructed of polished 5032 H32 aluminum Grip Strut® grating with angled outer corners. The step shall feature a splash guard to reduce water and debris from splashing in to the step. The splash guard shall have an opening on the outer edge to allow debris and water to flow through rather than becoming trapped within the stepping surface. The lower step shall be mounted to a frame which is integral with the construction of the cab for rigidity and strength. The middle step shall be integral with the cab construction and shall be trimmed with a Flex-Tred® adhesive grit surface material.

167. UNDER CAB ACCESS DOOR

The cab shall include an aluminum access door in the left crew step riser painted to match the cab interior paint with a push and turn latch. The under cab access door shall provide access to the diesel exhaust fluid fill.

168. INTERIOR DOOR TRIM

The interior trim on the doors of the cab shall consist of an aluminum panel constructed of Marine Grade 5052-H32 0.13 of an inch thick aluminum plate. The door panels shall include a painted finish with stainless bottom kick panel covering lower half.

169. DOOR TRIM CUSTOMER NAMEPLATE

The interior door trim on the front doors shall include a customer nameplate which states the vehicle was custom built for their Department.

170. CAB DOOR TRIM REFLECTIVE

The interior of each door shall include high visibility reflective tape. A white reflective tape shall be provided vertically along the rear outer edge of the door. The lowest portion of each door skin shall include a reflective tape chevron with red and white stripes and a Spartan logo. The chevron tape shall measure 6.00 inches in height.

171. INTERIOR GRAB HANDLE FRONT DOOR

Each front door shall include one (1) ergonomically contoured 9.00 inch cast aluminum handle mounted horizontally on the interior door panels. The handles shall feature a textured black powder coat finish to assist personnel entering and exiting the cab.

172. INTERIOR GRAB HANDLE REAR DOOR

A black powder coated cast aluminum assist handle shall be provided on the inside of each rear crew door. A 30.00 inch long handle shall extend horizontally the width of the window just above the window sill. The handle shall assist personnel in exiting and entering the cab.

173. INTERIOR SOFT TRIM COLOR

The cab interior soft trim surfaces shall be gray in color.

174. INTERIOR TRIM SUN VISOR

The header shall include two (2) sun visors, one each side forward of the driver and officer seating positions above the windshield. Each sun visor shall be constructed of Masonite and covered with padded vinyl trim.

175. INTERIOR ABS TRIM COLOR

The cab interior vacuum formed ABS composite trim surfaces shall be gray in color.

176. INTERIOR FLOOR MAT COLOR

The cab interior floor mat shall be gray in color.

177. CAB PAINT INTERIOR DOOR TRIM

The inner door panel surfaces shall be painted with multi-tone onyx black texture finish.

178. DASH PANEL GROUP

The main center dash area shall include three (3) removable panels located one (1) to the right of the driver position, one (1) in the center of the dash and one (1) to the left of the officer position. The center panel shall be within comfortable reach of both the driver and officer.

179. SWITCHES CENTER PANEL

The center dash panel shall include twelve (12) rocker switch positions in a six (6) over six (6) switch configuration in the left portion of the panel.

A rocker switch with a blank legend installed directly above shall be provided for any position without a switch and legend designated by a specific option. The non-specified switches shall be two-position, black switches with a green indicator light. Each blank switch legend can be custom engraved by the body manufacturer. All switch legends shall have backlighting provided.

180. SWITCHES LEFT PANEL

The left dash panel shall include eight (8) switches in a single row configuration. Five (5) of the switches shall be rocker type and the left three (3) shall be the headlight switch, the instrument lamp dimmer switch and the windshield wiper/washer control switch.

A rocker switch with a blank legend installed directly above shall be provided for any position not designated by a specific option. The non-designated switches shall be two-position, black switches with

a green indicator light. Each blank switch legend can be custom engraved by the body manufacturer. All switch legends shall have backlighting provided.

181. SWITCHES RIGHT PANEL

The right dash panel shall include no rocker switches or legends.

182. SEAT BELT WARNING

A Weldon seat belt warning system, integrated with the Vehicle Data Recorder system, shall be installed for each seat within the cab. The system shall activate an indicator light in the instrument panel, a digital seat position indicator with a seat position legend in the switch panel, and an audible alarm.

The warning system shall activate when any seat is occupied with a minimum of 60 pounds and the corresponding seat belt remains unfastened. The warning system shall also activate when any seat is occupied and the corresponding seat belt was fastened in an incorrect sequence. Once activated, the visual indicators and audible alarm shall remain active until all occupied seats have the seat belts fastened.

183. SEAT MATERIAL

The seats shall include a covering of high strength, wear resistant fabric made of durable ballistic polyester. A PVC coating shall be bonded to the back side of the material to help protect the seats from UV rays and from being saturated or contaminated by fluids. Common trade names for this material are Imperial 1200 and Durawear.

184. SEAT COLOR

All seats supplied with the chassis shall be gray in color. All seats shall include red seat belts.

185. SEAT BACK LOGO

The seat back shall include the “Spartan” logo. The logo shall be centered on the standard headrest of the seat back and on the left side of a split headrest.

186. SEAT DRIVER

The driver’s seat shall be an H.O. Bostrom 400 Series Sierra model seat with air suspension. The four-way seat shall feature 3.00 inch vertical travel air suspension and manual fore and aft adjustment with 5.00 inches of travel. The suspension control shall be located on the seat below the left front corner of the bottom cushion. The seat shall also feature integral springs to isolate shock.

The seat position shall include a three-point shoulder harness with lap belt and an automatic retractor attached to the cab. The buckle portion of the seat belt shall be mounted on a semi-rigid stalk extending from the seat base within easy reach of the occupant.

The minimum vertical dimension from the seat H-point to the ceiling for this belted seating position shall be 37.00 inches measured with the seat suspension height adjusted to the upper limit of its travel.

This model of seat shall have successfully completed the static load tests set forth by FMVSS 207, 209, and 210 in effect at the time of manufacture. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity.

The materials used in construction of the seat shall also have successfully completed testing with regard to the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which dictates the allowable burning rate of materials in the occupant compartments of motor vehicles.

187. SEAT BACK DRIVER

The driver's seat shall feature a two (2) way adjustable lumbar support and offer an infinite fully reclining adjustable titling seat back. The seat back shall also feature a contoured head rest.

188. SEAT MOUNTING DRIVER

The driver's seat shall be installed in an ergonomic position in relation to the cab dash.

189. OCCUPANT PROTECTION DRIVER

The driver's position shall be equipped with the Advanced Protection System™ (APS). The APS shall selectively deploy integrated systems to protect against injuries in qualifying frontal impact, side impact, and rollover events. The increase in survivable space and security of the APS shall also provide ejection mitigation protection.

The driver's seating area APS shall include:

- Advanced seat belt system - retractor pre-tensioner tightens the seat belt around the driver, securing the occupant in the seat and the load limiter plays out some of the seat belt webbing to reduce seat belt to chest and torso force upon impact as well as mitigate head and neck injuries.
- Large side curtain airbag - protects the driver's head, neck, and upper body from dangerous cab side surfaces and contact points with intrusive surfaces as a result of a collision as well as provides ejection mitigation protection to the driver in a qualifying event by covering the window and the upper portion of the door.
- Dual knee airbags (patent pending) with energy management mounting (patent pending) - protects the driver's lower body from dangerous surface contact injuries, acceleration injuries, and from intrusion as well as locks the lower body in place so the upper body shall be slowed by the load limiting seat belt.

Steering wheel airbag - protects the driver's head, neck, and upper torso from contact injuries, acceleration injuries, and contact points with intrusive surfaces as a result of a collision.

190. SEAT OFFICER

The officer's seat shall be an H.O. Bostrom 400 Series Firefighter model seat. The seat shall feature two-way manual adjustment and shall include a tapered and padded seat cushion. The seat shall also feature integral springs to isolate shock.

The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt, automatic retractor and buckle as an integral part of the seat assembly.

The minimum vertical dimension from the seat H-point to the ceiling for this belted seating position shall be 35.00 inches.

This model of seat shall have successfully completed the static load tests by FMVSS 207, 209, 210 and 302 in effect at the time of manufacture. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of

gravity. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

191. SEAT BACK OFFICER

The officer's seat shall feature a SecureAll™ SCBA locking system which shall be one bracket model and store most U.S. and International SCBA brands and sizes up to a 60min bottle while in transit or for storage within the seat back. The bracket shall be easily adjustable for all SCBA brands and cylinder diameters. All adjustment points shall utilize similar hardware and adjustments shall be made with one tool.

The bracket shall be adjustable to compensate for different cylinder lengths without the use of tools. The adjustment shall be made by raising a lever and moving the top clamp vertically**.**

The bracket system shall be free of straps and clamps that may interfere with auxiliary equipment on SCBA units. The center guide fork shall keep the SCBA tank in place for a safe and comfortable fit in the seat back cavity. The SCBA unit simply needs to be pushed against the pivot arm to engage the patented auto- locking system. Once the lock is engaged, the top clamp shall surround the top of the SCBA tank for a secure fit in all directions.

The SecureAll™ shall include a release handle which shall be integrated into the seat cushion for quick and easy release. This shall eliminate the need for straps or pull cords to interfere with other SCBA equipment.

The seat back shall include a removable padded cover which shall be provided over the SCBA cavity.

192. SEAT MOUNTING OFFICER

The officer's seat shall be installed in an ergonomic position in relation to the cab dash.

193. OCCUPANT PROTECTION OFFICER

The officer's position shall be equipped with the Advanced Protection System™ (APS). The APS shall selectively deploy integrated systems to protect against injuries in qualifying frontal impact, side impact, and rollover events. The increase in survivable space and security of the APS shall also provide ejection mitigation protection.

The officer's seating area APS shall include:

- Advanced seat belt system - retractor pre-tensioner tightens the seat belt around the officer, securing the occupant in the seat and the load limiter plays out some of the seat belt webbing to reduce seat belt to chest and torso force upon impact as well as mitigate head and neck injuries.
- Large side curtain airbag - protects the officer's head, neck, and upper body from dangerous cab side surfaces and contact points with intrusive surfaces as a result of a collision as well as provides ejection mitigation protection to the officer in a qualifying event by covering the window and the upper portion of the door.

Knee airbags - protects the officer's lower body from dangerous surface contact injuries, acceleration injuries, and from contact points with intrusive surfaces as a result of a collision as well as locks the lower body in place so the upper body shall be slowed by the load limiting seat belt.

194. SEAT BELT ORIENTATION CREW

The crew position seat belts shall follow the standard orientation which extends from the outboard shoulder extending to the inboard hip.

195. SEAT REAR FACING OUTER LOCATION

The crew area shall include two (2) rear facing crew seats, which include one (1) located directly behind the left side front seat and one (1) located directly behind the right side front seat.

196. SEAT CREW REAR FACING OUTER

The crew area shall include a seat in the rear facing outboard position which shall be a H.O. Bostrom 400 Series Firefighter model seat. The seat shall feature a tapered and padded seat, and cushion.

The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt and automatic retractor as an integral part of the seat assembly. The buckle portion of the seat belt shall extend from the seat base towards the driver position within easy reach of the occupant.

The minimum vertical dimension from the seat H-point to the ceiling for each belted seating position shall be 35.00 inches.

This model of seat shall have successfully completed the static load tests by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. In order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95th percentile hybrid III male weighing 225 pounds rather than the 50th percentile male dummy weighing 165 pounds as referenced in FMVSS 208. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

197. SEAT BACK REAR FACING OUTER

The rear facing outboard seat shall feature a Bostrom SecureAll™ self-contained breathing apparatus (SCBA) locking system which shall store most U.S. and International SCBA brands and bottle sizes while in transit or for storage within the seat back. The bracket shall be easily adjustable for all SCBA brands and cylinder diameters. All adjustment points shall utilize similar hardware and adjustments shall be made with one tool.

The bracket shall be adjustable to compensate for different cylinder lengths without the use of tools. The adjustment shall be made by raising a lever and moving the top clamp vertically**.**

The bracket system shall be free of straps that may interfere with auxiliary equipment on SCBA units. The center guide fork shall keep the SCBA tank in place for a safe and comfortable fit in the seat back cavity. The SCBA unit simply needs to be pushed against the pivot arm to engage the patented auto-locking system. Once the lock is engaged, the top clamp shall surround the top of the SCBA tank for a secure fit in all directions.

The SecureAll™ shall include a release handle which shall be integrated into the center of the bottom seat cushion for easy access and to eliminate hooking the release handle with clothing or other equipment.

The seat back shall include a removable padded cover which shall be provided over the SCBA cavity.

198. SEAT MOUNTING REAR FACING OUTER

The rear facing outer seat shall be mounted facing the rear of the cab.

199. OCCUPANT PROTECTION REAR FACING OUTER

The rear facing outer seat position(s) shall be equipped with the Advanced Protection System™ (APS). The APS shall selectively deploy integrated systems to protect against injuries in qualifying frontal impact, side impact, and rollover events. The increase in survivable space and security of the APS shall also provide ejection mitigation protection.

Each rear facing outer seating position APS shall include:

- APS advanced seat belt system - retractor pre-tensioners tighten the seat belts around each occupant, securing the occupants in seats and load limiters play out some of the seat belt webbing to reduce seat belt to chest and torso force upon impact as well as mitigate head and neck injuries.

Side curtain airbag - protects each occupant's head, neck, and upper body from dangerous cab side surfaces and contact points with intrusive surfaces as a result of a collision as well as provides ejection mitigation protection to each occupant in a qualifying event by covering the windows and walls adjacent to each seating position with an airbag custom designed for each cab configuration.

200. SEAT FORWARD FACING CENTER LOCATION

The crew area shall include two (2) forward facing center crew seats with both located at the center of the rear wall.

201. SEAT CREW FORWARD FACING CENTER

The crew area shall include a seat in the forward facing center position which shall be a H.O. Bostrom 400 Series Firefighter model seat. The seat shall feature a tapered and padded seat, and cushion. The seat and cushion shall be hinged and compact in design for additional room and shall remain in the stored position until occupied.

The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt and automatic retractor as an integral part of the seat assembly. The buckle portion of the seat belt shall extend from the seat base towards the driver position within easy reach of the occupant.

The minimum vertical dimension from the seat H-point to the ceiling for each belted seating position shall be 35.00 inches.

This model of seat shall have successfully completed the static load tests by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a

guide with the following accommodations. In order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95th percentile hybrid III male weighing 225 pounds rather than the 50th percentile male dummy weighing 165 pounds as referenced in FMVSS 208. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

202. SEAT BACK FORWARD FACING CENTER

The forward facing center seat shall feature a SecureAll™ self-contained breathing apparatus (SCBA) locking system which shall be one bracket model and store most U.S. and International SCBA brands and sizes while in transit or for storage within the seat back. The bracket shall be easily adjustable for all SCBA brands and cylinder diameters. All adjustment points shall utilize similar hardware and adjustments shall be made with one tool.

The bracket shall be adjustable to compensate for different cylinder lengths without the use of tools. The adjustment shall be made by raising a lever and moving the top clamp vertically**.**

The bracket system shall be free of straps and clamps that may interfere with auxiliary equipment on SCBA units. The center guide fork shall keep the SCBA tank in place for a safe and comfortable fit in the seat back cavity. The SCBA unit simply needs to be pushed against the pivot arm to engage the patented auto- locking system. Once the lock is engaged, the top clamp shall surround the top of the SCBA tank for a secure fit in all directions.

The SecureAll™ shall include a release handle which shall be integrated into the seat cushion for quick and easy release. This shall eliminate the need for straps or pull cords to interfere with other SCBA equipment.

The seat back shall include a removable padded cover which shall be provided over the SCBA cavity.

203. OCCUPANT PROTECTION FORWARD FACING CENTER

The forward facing center seat position(s) shall be equipped with the Advanced Protection System™ (APS). The APS shall selectively deploy integrated systems to protect against injuries in qualifying frontal impact, side impact, and rollover events. The increase in survivable space and security of the APS shall also provide ejection mitigation protection.

Each forward facing center seating position APS shall include:

- APS advanced seatbelt system - retractor pre-tensioners tighten the seat belts around each occupant, securing the occupants in seats and load limiters play out some of the seat belt webbing to reduce seat belt to chest and torso force upon impact as well as mitigate head and neck injuries.

Side curtain airbag - provides ejection mitigation protection to each occupant in a qualifying event by covering the windows and walls adjacent to crew seating with an airbag custom designed for each cab configuration.

204. SEAT FRAME FORWARD FACING

The forward facing center seating positions shall include an enclosed seat frame located and installed on the rear wall. The seat frame shall measure 42.38 inches wide X 12.38 inches high X 22.00 inches deep.

The seat frame shall be constructed of Marine Grade 5052-H32 0.19 inch thick aluminum plate. The seat box shall be painted with the same color as the remaining interior.

205. SEAT FRAME FORWARD FACING STORAGE ACCESS

There shall be two (2) access points to the seat frame storage area, one (1) on each side of the seat frame. Each access point shall be covered by a hinged door which measures 15.00 inches in width X 10.63 inches in height.

206. SEAT MOUNTING FORWARD FACING CENTER

The forward facing center seats shall be installed facing the front of the cab.

207. CAB FRONT UNDER SEAT STORAGE ACCESS

The left and right under seat storage areas shall have a solid aluminum hinged door with non-locking latch.

208. SEAT COMPARTMENT DOOR FINISH

All under seat storage compartment access doors shall have a multi-tone onyx black texture finish.

209. WINDSHIELD WIPER SYSTEM

The cab shall include a dual arm wiper system which shall clear the windshield of water, ice and debris. There shall be two (2) windshield wipers which shall be affixed to a radial wet arm. The system shall include a single motor which shall initiate the arm in which both the left hand and right hand windshield wipers are attached, initiating a back and forth motion for each wiper. The wiper motor shall be activated by an intermittent wiper control located within easy reach of the driver's position.

210. ELECTRONIC WINDSHIELD FLUID LEVEL INDICATOR

The windshield washer fluid level shall be monitored electronically. When the washer fluid level becomes low the yellow "Check Message Center" indicator light on the instrument panel shall illuminate and the message center in the dual air pressure gauge shall display a "Check Washer Fluid Level" message.

211. CAB DOOR HARDWARE

The cab entry doors shall be equipped with exterior pull handles, suitable for use while wearing firefighter gloves. The handles shall be made of a fiber reinforced plastic composite with a black matt finish.

The interior exit door handles shall be flush paddle type with a black finish, which are incorporated into the upper door panel.

All cab entry doors shall include locks which are keyed alike. The door locks shall be designed to prevent accidental lockout.

212. DOOR LOCKS

Each cab entry door shall include a manually operated door lock. Each door lock may be actuated from the inside of the cab by means of a red knob located on the paddle handle of the respective door or by using a TriMark key from the exterior. The door locks are designed to prevent accidental lock out.

213. GRAB HANDLES

The cab shall include one (1) 18.00 inch knurled, anti-slip, one-piece exterior assist handle behind each cab door. The grab handle shall be made of 14 gauge 304 stainless steel and be 1.25 inch diameter to enable non-slip assistance with a gloved hand.

214. REARVIEW MIRRORS

Retrac Aerodynamic West Coast style single vision mirror heads model 613275 shall be provided and installed on each of the front cab doors.

The mirrors shall be mounted via 1.00 inch diameter tubular stainless steel arms to provide a rigid mounting to reduce mirror vibration.

The mirrors shall measure 8.00 inches wide X 19.00 inches high and shall include an 8.00 inch convex mirrors with a stainless steel back, model 980-4, installed below the flat glass to provide a wider field of vision. The flat mirrors shall be motorized with remote horizontal and vertical adjustment. The control switches shall be mounted within easy reach of the driver. The convex mirrors shall be manually adjustable. The flat mirror glass shall be heated for defrosting in severe cold weather conditions.

The mirrors shall be constructed of a vacuum formed chrome plated ABS plastic housing that is corrosion resistant and shall include the finest quality non-glare glass.

215. REARVIEW MIRROR HEAT SWITCH

The heat for the rearview mirrors shall be controlled through a rocker switch on the dash in the switch panel.

216. CAB FENDER

Full width wheel well liners shall be installed on the extruded cab to limit road splash and enable easier cleaning. Each two-piece liner shall consist of an inner liner 16.00 inches wide made of vacuum formed ABS composite and an outer fenderette 5.00 inches wide made of 12-gauge polished aluminum.

217. CAB EXTERIOR FRONT & SIDE EMBLEMS

The cab shall include three (3) Spartan emblems. There shall be one (1) installed on the front air intake grille and one (1) emblem on the exterior of the cab on the lower forward portion of the front driver and officer side doors. The cab shall also include one (1) Advanced Protection System shield emblem on each front door.

218. IGNITION

A master battery system with a keyless start ignition system shall be provided. Each system shall be controlled by a one-quarter turn Cole Hersee switch, both of which shall be mounted to the left of the steering wheel on the dash. A chrome push type starter button shall be provided adjacent to the master battery and ignition switches.

Each switch shall illuminate a green LED indicator light on the dash when the respective switch is placed in the “ON” position.

The starter button shall only operate when both the master battery and ignition switches are in the “ON” position.

219. BATTERY

The single start electrical system shall include six (6) Harris BCI 31 925 CCA batteries with a 210 minute reserve capacity and 4/0 welding type dual path starter cables per SAE J541.

220. BATTERY TRAY

The batteries shall be installed within two (2) steel battery trays located on the left side and right side of the chassis, securely bolted to the frame rails. The battery trays shall be coated with the same material as the frame.

The battery trays shall include drain holes in the bottom for sufficient drainage of water. A durable, non-conducting, interlocking mat made by Dri-Dek shall be installed in the bottom of the trays to allow for air flow and help prevent moisture build up. The batteries shall be held in place by non-conducting phenolic resin hold down boards.

221. BATTERY BOX COVER

Each battery box shall include a steel cover which protects the top of the batteries. Each cover shall include flush latches which shall keep the cover secure as well as a black powder coated handle for convenience when opening.

222. BATTERY CABLE

The starting system shall include cables which shall be protected by 275 degree Fahrenheit. minimum high temperature flame retardant loom, sealed at the ends with heat shrink and sealant.

223. BATTERY JUMPER STUD

The starting system shall include battery jumper studs. These studs shall be located in the forward most portion of the driver's side lower step. The studs shall allow the vehicle to be jump started, charged, or the cab to be raised in an emergency in the event of battery failure.

224. ALTERNATOR

The charging system shall include a 270 amp Leece Neville 12-volt alternator. The alternator shall include a self-excited integral regulator.

225. HEADLIGHTS

The cab front shall include four (4) rectangular halogen headlamps with separate high and low beams mounted in bright chrome bezels.

226. FRONT TURN SIGNALS

The front fascia shall include two (2) Whelen model 600 4.00 inch X 6.00 inch programmable LED amber turn signals which shall be installed in a chrome bezel outboard of the front warning and above the headlamps.

227. HEADLIGHT LOCATION

The headlights shall be located on the front fascia of the cab directly below the front warning lights.

228. SIDE TURN/MARKER LIGHTS

The sides of the cab shall include two (2) LED round side marker lights which shall be provided just behind the front cab radius corners.

229. MARKER AND ICC LIGHTS

In accordance with FMVSS, there shall be five (5) LED cab marker lamps designating identification, center and clearance provided. These lights shall be installed on the face of the cab within full view of other vehicles from ground level.

230. HEADLIGHT AND MARKER LIGHT ACTIVATION

The headlights and marker lights shall be controlled through a rocker switch within easy reach of the driver. There shall be a dimmer switch within easy reach of the driver to adjust the brightness of the dash lights. The headlamps shall be equipped with the "Daytime Running" light feature, which shall illuminate the headlights to 80% brilliance when the battery master switch is in the "On" position and the parking brake is released.

231. GROUND LIGHTS

Each door shall include Amdor H2O LED model AY-9500-012 ground lighting mounted to the underside of the cab step below each door. The lights shall be 12.00 inches in length. The ground lighting shall be activated when the parking brake is set.

232. UNDER BUMPER LIGHTS

There shall be two (2) 12.00 inch long LED Amdor Luma Bar H2O™ NFPA compliant ground lights mounted under the forward face of the bumper outside of the frame rails. The under bumper ground lighting shall be interlocked with the park brake.

233. LOWER CAB STEP LIGHTS

The middle step located at each door shall include a recess mounted 4.00 inch round LED light which shall activate with the opening of the respective door.

234. INTERMEDIATE STEP LIGHTS

The intermediate step well area at each door shall include an LED light within a chrome housing. The Egress step lights shall provide visibility to the step well area for the first step exiting the vehicle. The Egress step lights shall activate with Entry step lighting.

235. ENGINE COMPARTMENT LIGHT

There shall be an LED NFPA compliant light mounted under the engine tunnel for area work lighting on the engine. The light shall include a polycarbonate lens, a housing which is vibration welded and a bulb which shall be shock mounted for extended life. The light shall activate automatically when the cab is tilted.

236. LIGHTBAR PROVISION

There shall be one (1) light bar installed on the cab roof. The light bar installation shall include mounting and wiring to a control switch on the cab dash.

237. CAB FRONT LIGHTBAR

The light bar provisions shall be for one (1) Whelen brand Freedom IV LED light bar mounted centered on the front of the cab roof. The light bar shall be 72.00 inches in length. The light bar shall feature six (6) red LED light modules and two (2) clear LED light modules. The entire light bar shall feature a clear lens. The clear lights shall be disabled with park brake engaged. The cable shall exit the light bar on the right side of the cab.

238. LIGHTBAR SWITCH

The light bar shall be controlled by a rocker switch located on the switch panel. This switch shall be clearly labeled for identification.

239. INTERIOR OVERHEAD LIGHTS

The cab shall include a two-section, red and clear Weldon LED dome lamp located over each door. The dome lamps shall be rectangular in shape and shall measure approximately 7.00 inches in length X 3.00 inches in width with a black colored bezel. The clear portion of each lamp shall be activated by opening the respective door and both the red and clear portion can be activated by individual push lenses on each lamp.

An additional incandescent three (3) light module with dual map lights shall be located over the engine tunnel which can be activated by individual switches on the lamp.

240. AUXILIARY DOME LIGHT REAR CREW

The cab shall include two (2) Whelen brand 60CREGCS 6.00 inch diameter red/clear type round shaped LED auxiliary dome lights in the headliner inboard of the outer seating positions. The red and clear portion of the lamps shall be activated by individual switches located on the side of each light.

241. DO NOT MOVE APPARATUS LIGHT

The front headliner of the cab shall include a flashing red Whelen Ion LED light clearly labeled "Do Not Move Apparatus". In addition to the flashing red light, an audible alarm shall be included which shall sound while the light is activated.

The flashing red light shall be located centered left to right for greatest visibility.

The light and alarm shall be interlocked for activation when either a cab door is not firmly closed or an apparatus compartment door is not closed, and the parking brake is released.

242. MASTER WARNING SWITCH

A master switch shall be included in the main rocker switch panel. The switch shall be a rocker type, red in color and labeled “Master” for identification. The switch shall feature control over all devices wired through it. Any warning device switch left in the “ON” position shall automatically power up when the master switch is activated.

243. INBOARD FRONT WARNING LIGHTS

The cab front fascia shall include two (2) Whelen 600 series Super LED front warning lights in the left and right inboard positions. The lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The lights shall be mounted to the front fascia of the cab within a chrome bezel.

244. INBOARD FRONT WARNING LIGHTS COLOR

The warning lights mounted on the cab front fascia in the inboard positions shall be red.

245. FRONT WARNING SWITCH

The front warning lights shall be controlled via rocker switch on the panel. This switch shall be clearly labeled for identification.

246. INTERSECTION WARNING LIGHTS

The chassis shall include two (2) Whelen 600 series Super LED intersection warning lights, one (1) each side. The lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors.

247. INTERSECTION WARNING LIGHTS COLOR

The intersection lights shall be red.

248. INTERSECTION WARNING LIGHTS LOCATION

The intersection lights shall be mounted on the side of the bumper in the rearward position.

249. SIDE WARNING LIGHTS

The cab sides shall include two (2) Whelen 600 series Super LED warning lights, one (1) on each side. The lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The lights shall be mounted to the sides of the cab within a chrome bezel.

250. SIDE WARNING LIGHTS COLOR

The warning lights located on the side of the cab shall be red.

251. SIDE WARNING LIGHTS LOCATION

The warning lights on the side of the cab shall be mounted over the front wheel well directly over the center of the front axle.

252. SIDE AND INTERSECTION WARNING SWITCH

The side warning lights shall be controlled through the master warning switch.

253. SIREN CONTROL HEAD

A Whelen 295HFSA7 electronic siren control head with remote dual amplifier shall be provided and flush mounted in the switch panel with a location specific to the customer's needs. The siren shall feature 200-watt output, radio broadcast, public address, wail, yelp, or piercer tones and hands free operation which shall allow the operator to turn the siren on and off from the horn ring if a horn/siren selector switch option is also selected.

254. HORN BUTTON SELECTOR SWITCH

A rocker switch shall be installed in the switch panel between the driver and officer to allow control of either the electric horn or the air horn from the steering wheel horn button. The electric horn shall sound by default when the selector switch is in either position to meet FMCSA requirements.

255. AIR HORN ACTIVATION

The air horn activation shall be accomplished by the steering wheel horn button for the driver and a right hand side Linemaster model SP491-S81 foot switch for the officer. An air horn activation circuit shall be provided to the chassis harness pump panel harness connector.

256. BACK-UP ALARM

Self-adjusting with noise level backup alarm shall be installed at the rear of the chassis with an output level of min 107 dB at maximum level. The alarm shall automatically activate when the transmission is placed in reverse.

257. INSTRUMENTATION

An ergonomically designed instrument panel shall be provided. Each gauge shall be backlit with LED lamps. Stepper motor movements shall drive all gauges. The instrumentation system shall be multiplexed and shall receive ABS, engine, and transmission information over the J1939 data bus to reduce redundant sensors and wiring.

A twenty-eight (28) icon light bar message center with integral LCD odometer/trip odometer shall be included. The odometer shall display up to 999,999.9 kilometers. The trip odometer shall display 9,999.9 kilometers. The LCD message center screen shall be capable of custom configuration by the users for displaying certain vehicle status and diagnostic functions.

The instrument panel shall contain the following gauges:

One (1) three-movement gauge displaying vehicle speed, fuel level, and Diesel Exhaust Fluid (DEF) level. The primary scale on the speedometer shall read from 0 to 160 KM/H, and the secondary scale on the speedometer shall read from 0 to 100 MPH. The scale on the fuel and DEF level gauges shall read from empty to full as a fraction of full tank capacity. Red indicator lights in the gauge and an audible alarm shall indicate low fuel or low DEF at $1/8^{th}$ tank level.

One (1) three-movement gauge displaying engine RPM, and primary and secondary air system pressures shall be included. The scale on the tachometer shall read from 0 to 3000 RPM. The scale on the air pressure gauges shall read from 0 to 150 pounds per square inch (PSI) with a red line zone indicating critical levels of air pressure. Red indicator lights in the gauge and an audible alarm shall indicate low air pressure.

One (1) four-movement gauge displaying engine oil pressure, coolant temperature, voltmeter, and transmission temperature shall be included. The scale on the engine oil pressure gauge shall read from 0 to 100 pounds PSI with a red line zone indicating critical levels of oil pressure. A red indicator light in the gauge and audible alarm shall indicate low engine oil pressure. The scale on the coolant temperature gauge shall read from 40 to 120 degrees Celsius (C) with a red line zone indicating critical coolant temperatures. A red indicator light in the gauge and audible alarm shall indicate high coolant temperature. The scale on the voltmeter shall read from 9 to 18 volts with a red line zone indicating critical levels of battery voltage. A red indicator light in the gauge and an audible alarm shall indicate high or low system voltage. The low voltage alarm shall indicate when the system voltage has dropped below 11.8 volts for more than 120 seconds in accordance with the requirements of NFPA 1901. The scale on the transmission temperature gauge shall read from 40 to 150 degrees Celsius (C) with a red line zone indicating critical temperatures. A red indicator light in the gauge and an audible alarm shall indicate a high transmission temperature.

The light bar portion of the message center shall include twenty-eight (28) LED backlit indicators. The light bar shall be split with fourteen (14) indicators on each side of the LCD message screen. The light bar shall contain the following indicators and produce the following audible alarms when supplied in conjunction with applicable configurations:

258. RED INDICATORS

Stop Engine - indicates critical engine fault
Air Filter Restricted - indicates excessive engine air intake restriction
Park Brake - indicates parking brake is set
Seat Belt - indicates a seat is occupied and corresponding seat belt remains unfastened

Low Coolant - indicates critically low engine coolant
Cab Tilt Lock - indicates the cab tilt system locks are not engaged.

259. AMBER INDICATORS

Malfunction Indicator Lamp (MIL) - indicates an engine emission control system fault
Check Engine - indicates engine fault
Check Transmission - indicates transmission fault
Anti-Lock Brake System (ABS) - indicates anti-lock brake system fault
High exhaust system temperature – indicates elevated exhaust temperatures
Water in Fuel - indicates presence of water in fuel filter
Wait to Start - indicates active engine air preheat cycle
Windshield Washer Fluid – indicates washer fluid is low
DPF restriction - indicates a restriction of the diesel particulate filter
Regen Inhibit-indicates regeneration of the DPF has been inhibited by the operator
Range Inhibit - indicates a transmission operation is prevented and requested shift request may not occur.
SRS - indicates a problem in the supplemental restraint system
Check Message - indicates a vehicle status or diagnostic message on the LCD display requiring attention.

260. GREEN INDICATORS

Left and Right turn signal indicators
ATC - indicates low wheel traction for automatic traction control equipped vehicles, also indicates mud/snow mode is active for ATC system
High Idle - indicates engine high idle is active.
Cruise Control - indicates cruise control is enabled
OK to Pump - indicates the pump is engaged and conditions have been met for pump operations
Pump Engaged - indicates the pump transmission is currently in pump gear
Auxiliary Brake - indicates secondary braking device is active

261. BLUE INDICATORS

High Beam indicator

262. AUDIBLE ALARMS

Air Filter Restriction
Cab Tilt Lock
Check Engine
Check Transmission
Open Door/Compartment
High Coolant Temperature
High or Low System Voltage
High Transmission Temperature
Low Air Pressure
Low Coolant Level
Low DEF Level
Low Engine Oil Pressure
Low Fuel
Seatbelt Indicator
Stop Engine
Water in Fuel

Extended Left/Right Turn Signal On
ABS System Fault

263. BACKLIGHTING COLOR

The instrumentation gauges and the switch panel legends shall be backlit using red LED backlighting.

264. CAB EXTERIOR PROTECTION

The cab face shall have a removable plastic film installed over the painted surfaces to protect the paint finish during transport to the body manufacturer.

265. FIRE EXTINGUISHER

A 2.50 pound D.O.T approved fire extinguisher with BC rating shall be shipped loose with the cab.

266. DOOR KEYS

The cab and chassis shall include a total of four (4) door keys for the manual door locks.

267. DIAGNOSTIC SOFTWARE OCCUPANT PROTECTION

Diagnostic software for the Spartan Advanced Protection System shall be available for free download from the Spartan Chassis website to Spartan authorized OEMs, dealers and service centers, as well as the vehicle owner.

The software has been validated to be compatible with the following RP1210 interface adapters:

- Dearborn Group DPA4 Plus
- Noregon Systems JPRO® DLA+
- Cummins INLINE5
- Cummins INLINE6
- NexIQ™ USB-Link™

The software and adapter utilize the SAE J1939-13 heavy duty nine (9) pin connector which is located below the driver's side dash to the left of the steering column.

268. WARRANTY

The chassis manufacturer shall provide a limited parts and labor warranty to the original purchaser of the custom built cab and chassis for a period of twenty-four (24) months, or the first 36,000 miles, whichever occurs first. The warranty period shall commence on the date the vehicle is delivered to the first end user.

269. CHASSIS OPERATION MANUAL

There shall be two (2) digital copies of the chassis operation manual provided with the chassis. The digital data shall include a parts list specific to the chassis model.

270. ENGINE AND TRANSMISSION OPERATION MANUALS

The following manuals specific to the engine and transmission models ordered will be included with the chassis in the ship loose items:
Two (2) Hard copies of the Engine Operation and Maintenance manual with CD
Two (2) Digital copies of the Transmission Operator's manual
Two (2) Digital copies of the Engine Owner's manual

271. ENGINE SERVICE MANUALS

There shall be two (2) printed hard copy sets of Cummins ISC/ISL engine service reference manuals which shall be provided with the chassis.

272. TRANSMISSION SERVICE MANUALS

There shall be two (2) printed hard copy sets of Allison 3000 transmission service manuals included with the chassis.

273. CAB/CHASSIS AS BUILT WIRING DIAGRAMS

The cab and chassis shall include one (1) digital copy of wiring schematics and option wiring diagrams.

274. PAINT CONFIRMATION

There shall be a paint confirmation letter sent to the body manufacturer with paint spray outs to confirm the cab primary paint color or primary and secondary paint color as specified by the paint options.

275. CHASSIS - EXHAUST AND HEAT SHIELDS

The exhaust will be extended to edge of the body near the rear wheels. Fabricated stainless steel exhaust heat shields will be provided to eliminate excessive heat to the body. The shields will be installed to where the exhaust runs beneath the body to the point where the exhaust exits below the body side.

276. CHASSIS - POWER TAKE OFF (PTO) - 10 BOLT - CHELSEA 280 SERIES

One (1) Chelsea 280 series ten bolt power take-off (PTO) will be supplied to drive the CAFS compressor. The PTO will be selected by the component manufacturer to provide the correct power output, speed and rotation. The engagement will be located in the cab with suitable labels.

277. CHASSIS - FUEL TANK FILLER - CAST DOOR

A cast aluminum fuel tank filler complete with hinged cover will be mounted on the left side body fender.

278. CHASSIS - MUD FLAPS - FRONT (PAIR)

Heavy duty front mud flaps will be supplied.

279. CHASSIS - MUD FLAPS - REAR (PAIR)

Heavy duty rear mud flaps will be supplied.

280. CHASSIS - FRONT BUMPER EXTENSION - HOSE COMPARTMENT - SURFACE MOUNT

The front bumper extension shall have a surface mounted hose compartment mounted onto the bumper apron, centered between the frame rails, and sized to accommodate min. 100 feet of 1 3/4" hose. The compartment length will extend across the top of the bumper, but not to exceed the front cab radius. The compartment will be fabricated from aluminum checker plate complete with drain holes to prevent moisture from building up.

The checker plate cover will include lift handles along the forward face and gas cylinder to hold the cover in the open position. Rubber ball T-handle style hold downs will be used on both ends to hold the cover in the closed position.

281. CHASSIS - ENGINE TUNNEL - MOUNTING PLATE

A 3/16" aluminum plate will be provided on the engine tunnel to allow for equipment mounting. The plate will be mounted to the engine tunnel by means of aluminum channels under the plate. This allows for the removal of the plate if adjustments or changes are made to the layout. The plate will be powder coated and as large as possible.

282. CHASSIS - BRACKET - HELMET HOLDER - ONSCENE TALON (EACH)

Six (6) OnScene Solutions Talon helmet storage brackets designed to meet current NFPA regulations will be supplied and installed. The Talon shall be constructed of aluminum and stainless steel. The Talon shall securely fasten fire helmets to flat cab surfaces. The Talon features multi-adjustable brim points for nearly any helmet size or configuration.

Mounted at the following locations:
One (1) over top of the driver seat
One (1) over top of the officer seat
Four (4) on the rear cab wall, two each side outboard of the forward facing seats

283. CHASSIS - BRACKET - HELMET HOLDER - TRACKING (EACH)

Four (4) pieces of aluminum tracking will be supplied installed in the cab with the appropriate backing support allowing for the installation and adjustment of helmet holder brackets (or similar accessories).

Mounted in the following locations:
One (1) over top of the driver seat
One (1) over top of the officer seat
Two (2) on the rear cab wall, one each side outboard of the forward facing seats

284. PUMP HOUSE - MID MOUNT - REAR CONTROL - INTEGRAL WITH BODY

The pump enclosure will be formed integral with the body using similar construction methods to create a uniform and aesthetically pleasing exterior without sacrificing the functionality and accessibility required.

The left and right side suction/discharge and service panels will be enclosed within the body compartments labelled DS1 and PS1 respectively. The left and right side compartment interiors shall be split into two sections with the top section containing the removable pump access panels and the lower section containing a one-piece suction and discharge panel. Each of the panels will be fabricated from 3/16” aluminum sheet. The pump access panels will be finished to match the compartment while the lower suction and discharge panels will be powder coated black.

The pump access panels will be provided with press to release style thumb latches allowing quick access into the pump compartment without the use of tools.

The front face of the pump enclosure will be provided with a removable checker plate pump access panel. This panel will only be accessible when the Spartan cab is tilted.

A minimum of one Amdor Luma Bar LED light will be provided inside the pump compartment and will have a switch near the right side access door.

The left and right hand side discharge/suction panels are fully illuminated by indirect lighting supplied adjacent to the respective compartment door. All plumbing and functions are to be identified by a

permanent engraved nameplate with the plumbing colour coded to provide ease of identification with their corresponding valve controller and drain.

285. PUMP - MIDSHIP - WATEROUS CSUC20 - 1,250 IGPM

A Waterous CSU pump complete with C20 pump transmission shall be provided and mounted between the cab and rear axle, commonly referred to as the mid-ship location. The pump shall be of single stage construction and shall comply with all applicable requirements of the latest standards for automotive fire apparatus of the National Fire Protection Association and shall have a rated capacity of 1,250 imperial gallons per minute. The Pump shall be free from objectionable pulsation and vibration under all normal operating conditions.

The pump body shall be close-grained, gray iron and must be horizontally split in two sections for easy removal of the entire impeller shaft assembly, and designed for complete servicing from the bottom of the truck without disturbing setting of the pump in the chassis or apparatus piping which is connected to the pump. Pump body halves shall be bolted together on a single horizontal face to minimize leakage and facilitate reassembly.

The discharge manifold shall be cast as an integral part of the pump body assembly and shall provide at least three full 3-1/2 inch openings for ultimate flexibility in providing various discharge outlets for maximum efficiency.

The impeller shall be bronze with double suction inlets, accurately balanced (mechanically and hydraulically), of mixed flow design with reverse flow, labyrinth type, wear rings that resist water bypass and loss of efficiency due to wear. The impeller shall have flame plated hubs to assure maximum pump life and efficiency despite the presence of abrasive particles, such as fine sand, in the water being pumped.

The wear rings shall be bronze, and shall be easily replaceable to restore original pump efficiency and eliminate the need for replacing the entire pump casing due to wear.

The impeller shaft shall be stainless steel, accurately ground to size. The impeller shaft shall be of two-piece construction separable between the pump and pump transmission to allow true separation of the transmission from the pump without disassembly of either component.

The impeller shaft shall be supported at each end by oil or grease lubricated anti-friction ball bearings for rigid and precise support. Bearings shall be protected from water and sediment by suitable seal housings, flinger rings, and oil seals. No sleeve type bearings shall be used.

The seal housings shall be equipped with two-piece glands to permit adjustment or replacement of packing without disturbing pump. Lantern rings shall be located at inner ends of seal housings so that all rings of packing can be removed without removal of the lantern rings. Water shall be fed into seal housing lantern rings for proper lubrication and cooling when the pump is operating.

The pump transmission shall be rigidly attached to the pump body assembly and be of latest design incorporating a high strength, involute tooth form Morse™ HV chain drive capable of operating at high speeds to provide smooth, quiet transfer of power. The shift engagement shall be accomplished by a free-sliding collar and shall incorporate an internal locking mechanism to ensure that collar will be maintained in ROAD or PUMP position.

An electric over air pump shift control panel will be mounted in the cab on the left panel of the center dash. The following shall be provided on the panel:

- a three (3) position locking toggle switch
- an engraved PUMP ENGAGED identification light
- and an engraved OK TO PUMP identification light

The pump shift control panel shall be black with a yellow border outline and shall include pump instructions. An instruction plate describing the transmission shift selector position used for pumping shall be provided and located so it can be read from the driver's position. The road mode shall be selected when the switch is in the up position and pump mode shall be selected when the switch is in the down position.

The center switch position shall exhaust air from both pump and road sides of the pump gear box shift cylinder.

The priming system shall include an oil-free rotary vane priming pump rigidly attached to the pump transmission and activated by a vacuum-activated priming (VAP) valve with a single push-button switch. Valve actuation may be accomplished while the main pump is in operation, if necessary to assure a complete prime of all suction lines.

A single ¼ turn drain valve will be supplied for the pump while the remaining discharges will have independent ¼ turn drains. For difficult to reach plumbing auto drains may be used.

286. PUMP PANEL - REAR CONTROL - ENCLOSED IN BODY

The pump operator station will be formed integral with the body using similar construction methods to create a uniform and aesthetically pleasing exterior without sacrificing the functionality and accessibility required.

The pump operator station and suction/discharge panel will be enclosed within the body compartment labelled RR respectively. The area will be split into two sections with the upper section containing the operator panel and the lower containing a one-piece suction and discharge panel. Both panels will be fabricated from 3/16" aluminum sheet.

The pump operator's panel will be vertically hinged along the left side allowing the panel to swing open and provide ample service access.

Both the upper and lower panels will be finished to match the compartment interior.

The panels are fully illuminated by indirect lighting supplied adjacent to the respective compartment door. All plumbing, instrumentation, and functions are to be identified by a permanent nameplate with the plumbing colour coded to provide ease of identification with their corresponding valve controller and drain.

287. PUMP PANEL - OPERATOR DIAGRAMMATIC - SIGNATURE FULL GRAPHIC

A two-piece custom pump operator panel decal will be produced and applied to both the upper and lower panels in the RR compartment. The decal design and layout will allow for easy recognition of discharge or suction controls and their relative location on the apparatus. This is achieved through the use of colours corresponding to the colour surrounding the gauge and controls of the discharges or suctions and a top view diagram showing the locations of the specific plumbing around the apparatus.

The decal artwork will be discussed and approved by the fire department prior to installation.

288. PUMP PANEL - PRESSURE GOVERNOR - FRC - INCONTROL 400

A Fire Research InControl TGA400 series pressure governor and monitoring display kit shall be installed on the pump operator's panel. The kit shall include a control module, intake pressure sensor, discharge pressure sensor, and cables. The control module case shall be waterproof and have dimensions not to exceed 5 1/2" high by 10 1/2" wide by 2" deep. The control knob shall be 2" in diameter with no mechanical stops, have a serrated grip, and a red idle push button in the center. It shall not extend more than 1 3/4" from the front of the control module. Inputs for monitored information shall be from a J1939 data bus or independent sensors. Outputs for engine control shall be on the J1939 data bus or engine specific wiring.

The following continuous displays shall be provided:

- Pump discharge; shown with four daylight bright LED digits more than 1/2" high
- Pump Intake; shown with four daylight bright LED digits more than 1/2" high
- Pressure / RPM setting; shown on a dot matrix message display
- Pressure and RPM operating mode LEDs
- Throttle ready LED
- Engine RPM; shown with four daylight bright LED digits more than 1/2" high
- Check engine and stop engine warning LEDs
- Oil pressure; shown on a dual color (green/red) LED bar graph display
- Engine coolant temperature; shown on a dual color (green/red) LED bar graph display
- Transmission Temperature: shown on a dual color (green/red) LED bar graph display
- Battery voltage; shown on a dual color (green/red) LED bar graph display.

The dot-matrix message display shall show diagnostic and warning messages as they occur. It shall show monitored apparatus information, stored data, and program options when selected by the operator. All LED intensity shall be automatically adjusted for day and night time operation.

The program shall store the accumulated operating hours for the pump and engine to be displayed with the push of a button. It shall monitor inputs and support audible and visual warning alarms for the following conditions:

- High Battery Voltage
- Low Battery Voltage (Engine Off)
- Low Battery Voltage (Engine Running)
- High Transmission Temperature
- Low Engine Oil Pressure
- High Engine Coolant Temperature
- Out of Water (visual alarm only)
- No Engine Response (visual alarm only).

The program features shall be accessed via push buttons and a control knob located on the front of the control panel. There shall be a USB port located at the rear of the control module to upload future firmware enhancements.

Inputs to the control panel from the pump discharge and intake pressure sensors shall be electrical. The discharge pressure display shall show pressures from 0 to 600 psi. The intake pressure display shall show pressures from -30 in. Hg to 600 psi.

The governor shall operate in two control modes, pressure and RPM. No discharge pressure or engine RPM variation shall occur when switching between modes. A throttle ready LED shall light when the interlock signal is recognized. The governor shall start in pressure mode and set the engine RPM to idle. In pressure mode the governor shall automatically regulate the discharge pressure at the level set by the operator. In RPM mode the governor shall maintain the engine RPM at the level set by the operator except in the event of a discharge pressure increase. The governor shall limit a discharge pressure increase in RPM mode to a maximum of 30 psi. Other safety features shall include recognition of no water conditions with an automatic programmed response and a push button to return the engine to idle.

289. PUMP PANEL - WATER LEVEL GAUGE - FRC - TANKVISION

One (1) Fire Research TankVision water tank level indicator will be supplied and installed on the pump operator's panel. Each indicator will include an electronic indicator module and a pressure sensor. The TankVision will show the volume of water in the tank on nine (9) easy to see, super bright LEDs, with a wide view lens over the LEDs. The lens will provide a viewing angle of 180 degrees. The indicator case shall be waterproof, manufactured of aluminum, and have a distinctive blue label.

The program features shall be accessed from the front of the indicator module which will support self-diagnostics capabilities, self-calibration, and a datalink to connect remote indicators. Low water warnings shall include flashing LEDs at 1/4 tank, down chasing LEDs when the tank is almost empty.

The indicator will receive an input signal from an electronic pressure sensor mounted from the outside of the water tank near the bottom. No probe shall place on the interior of the tank.

290. PUMP PANEL - WATER LEVEL GAUGE - FRC - REMOTE DRIVER

A Fire Research TankVision remote light driver shall be installed. The driver shall provide four (4) separate outputs to control remote lights. The lights shall show 1/4, 1/2, 3/4, and full tank. When power is applied the driver shall run a test and cycle each remote light on and off. When the tank is less than 1/4 full the 1/4 tank light shall blink.

The remote light driver shall receive input information over a single wire from a Fire Research TankVision primary indicator.

291. PUMP PANEL - WATER LEVEL GAUGE - WHELEN - STRIP LITE (EACH)

Two (2) Whelen Strip-Lite tank status lights will be supplied and installed around the apparatus. Each light will feature four groups of coloured LEDs, green, blue, amber and red, to provide bright, easy to identify indication of water tank status.

Mounted at the following locations:
One (1) on the upper front corner of the left body side
One (1) on the upper right corner of the rear body side

292. PUMP PANEL - FOAM LEVEL GAUGE - FRC - TANKVISION

One (1) Fire Research TankVision water tank level indicator will be supplied and installed on the pump operator panel. Each indicator will include an electronic indicator module, a pressure sensor, and a tank vent. The TankVision will show the volume of foam in the tank on nine (9) easy to see, super bright LEDs, with a wide view lens over the LEDs. The lens will provide a viewing angle of 180 degrees. The indicator case shall be waterproof, manufactured of aluminum, and have a distinctive label.

The program features shall be accessed from the front of the indicator module which will support self-diagnostics capabilities, self-calibration, and a datalink to connect remote indicators. Low water warnings shall include flashing LEDs at 1/4 tank, down chasing LEDs when the tank is almost empty.

The indicator will receive an input signal from an electronic pressure sensor mounted from the outside of the water tank near the bottom. No probe shall place on the interior of the tank. The vent will be installed on the foam fill tower.

293. PUMP PANEL - HEAT EXCHANGER WITH FITTINGS - CHASSIS SUPPLIED

A closed circuit auxiliary heat exchange will be supplied with the chassis and installed in the engine cooling line by the chassis manufacturer. The cooler will provide additional cooling capacity without loss of any antifreeze.

A pump cooler circuit will be supplied and installed.

KZCO valves with electric actuators will be utilized for both cooling circuits. Each actuator will be controlled independently with a three position switch located at the pump operator's panel.

294. PUMP PANEL - ALARM - HIGH TEMPERATURE/LOW OIL PRESSURE

An alarm system consisting of a red light and audible buzzer will be installed at the pump panel to indicate when the engine water temperature is too high or that the oil is too low.

295. PLUMBING - 6" MAIN SUCTION - LEFT

One (1) 6" main suction will be provided from the pump and extend through the left side pump panel complete with trim around the opening. The suction end will terminate with NH threads. A Northline 4" storz to 6" female swivelling adapter with 30° elbow, suction screen, and storz cap will be provided on the suction inlet.

An Elkhart Master Intake Valve (MIV) with pressure relief will be installed in line with the suction inlet. The butterfly valve will be supplied with an electric actuator. Each actuator has built-in electrical stops and a position feedback signal. The unit is water tight, corrosion resistant, and equipped with an emergency override accessible through the lower suction/discharge panel in DS1. The opening and closing speed of the valve is pre-set to comply with the NFPA standard.

An Elkhart UBEC-1 electric valve controller will be supplied on the operator's panel. The controller will have a 10 LED valve position indicator, open/closed switches, and a pre-set button. The valve position indicator will automatically dim during night time operation. The pre-set button is programmable in the field.

The Elkhart valve will be supplied with an adjustable pressure relief valve.

A 1/4 turn manual air bleed will be provided on the pump operator panel.

An Elkhart electric 2 1/2" direct tank fill valve shall be plumbed directly to the water tank from the main pump inlet. This valve is to be used in conjunction with an automatic level control to maintain the water supply on the truck without operator intervention.

The Auto Tank valve will include an "Auto/Manual" switch on the pump panel and will be integrated with the water level gauge.

296. PLUMBING - 6" MAIN SUCTION - RIGHT

One (1) 6" main suction will be provided from the pump and extend through the right side pump panel complete with trim around the opening. The suction end will terminate with NH threads. A Northline 4" storz to 6" female swivelling adapter with 30° elbow, suction screen, and storz cap will be provided on the suction inlet.

An Elkhart Master Intake Valve (MIV) with pressure relief will be installed in line with the suction inlet. The butterfly valve will be supplied with an electric actuator. Each actuator has built-in electrical stops and a position feedback signal. The unit is water tight, corrosion resistant, and equipped with an emergency override accessible through the lower suction/discharge panel in PS1. The opening and closing speed of the valve is pre-set to comply with the NFPA standard.

An Elkhart UBEC-1 electric valve controller will be supplied on the operator's panel. The controller will have a 10 LED valve position indicator, open/closed switches, and a pre-set button. The valve position indicator will automatically dim during night time operation. The pre-set button is programmable in the field.

The Elkhart valve will be supplied with an adjustable pressure relief valve.

A 1/4 turn manual air bleed will be provided on the pump operator panel.

An Elkhart electric 2 1/2" direct tank fill valve shall be plumbed directly to the water tank from the main pump inlet. This valve is to be used in conjunction with an automatic level control to maintain the water supply on the truck without operator intervention.

The Auto Tank valve will include an "Auto/Manual" switch on the pump panel and will be integrated with the water level gauge.

297. PLUMBING - SUCTION RELIEF VALVE - ELKHART

One (1) Elkhart suction relief valve, pre-set for 125psi will be supplied and installed on the pump with the discharge side of the valve plumbed below the pump house. No threads will be provided on the discharge end to prevent a cap from being installed.

298. PLUMBING - TANK SUCTION - 4" WITH 3" VALVE

A 4" flexible supply line is to be provided from the tank to the pump. A 1/4 turn 3" Elkhart valve will be supplied with an electric actuator. The actuator will have built-in electrical stops and a position feedback signal. The unit is water tight, corrosion resistant, and equipped with an emergency override. The opening and closing speed of the valve is pre-set to comply with NFPA recommendations.

An Elkhart UBEC-1 electric valve controller will be supplied on the operator's panel. The controller will have a 10 LED valve position indicator, open/closed switches, and a pre-set button. The valve position indicator will automatically dim during night time operation. The pre-set button is programmable in the field.

299. PLUMBING - 2 1/2" INTERNAL SUCTION - LEFT

One (1) 2 1/2" left suction inlet will be supplied. Full 2 1/2" galvanized plumbing will be provided from the fire pump to the left side of the pump panel and will terminate in a chrome plated port and cap with plastic coated cord.

Each will be supplied with a 1/4 turn Elkhart valve with an electric actuator with built-in electrical stops and a position feedback signal. The unit is water tight, corrosion resistant, and equipped with an emergency override. The opening and closing speed of the valve is pre-set to comply with NFPA recommendations.

An Elkhart UBEC-1 electric valve controller will be supplied on the operator's panel. The controller will have a 10 LED valve position indicator, open/closed switches, and a pre-set button. The valve position indicator will automatically dim during night time operation. The pre-set button is programmable in the field.

A removable inspection plate will be provided to allow service of valve. The plate will be powder coated black to match the suction and discharge panel.

300. PLUMBING - 2 1/2" INTERNAL SUCTION - RIGHT

One (1) 2 1/2" right suction inlet will be supplied. Full 2 1/2" galvanized plumbing will be provided from the fire pump to the left side of the pump panel and will terminate in a chrome plated port and cap with plastic coated cord.

Each will be supplied with a 1/4 turn Elkhart valve with an electric actuator with built-in electrical stops and a position feedback signal. The unit is water tight, corrosion resistant, and equipped with an emergency override. The opening and closing speed of the valve is pre-set to comply with NFPA recommendations.

An Elkhart UBEC-1 electric valve controller will be supplied on the operator's panel. The controller will have a 10 LED valve position indicator, open/closed switches, and a pre-set button. The valve position indicator will automatically dim during night time operation. The pre-set button is programmable in the field.

A removable inspection plate will be provided to allow service of valve. The plate will be powder coated black to match the suction and discharge panel.

301. PLUMBING - 4" SUCTION WITH 4" ELECTRIC VALVE - REAR

One (1) 4" rear suction inlet will be supplied with a 4" valve. Full 4" galvanized plumbing will be provided from the fire pump to the rear body face terminating in a 4" storz fitting, screen and cap. The plumbing will not pass through the water tank and will be supported at both ends of the body.

A 1/4 turn Elkhart valve will be supplied and operated at the pump operator's panel. The valve will be supplied with an electric actuator with built-in electrical stops and a position feedback signal. The unit is water tight, corrosion resistant, and equipped with an emergency override. The opening and closing speed of the valve is pre-set to comply with NFPA recommendations.

An Elkhart UBEC-1 electric valve controller will be supplied on the operator's panel. The controller will have a 10 LED valve position indicator, open/closed switches, and a pre-set button. The valve position indicator will automatically dim during night time operation. The pre-set button is programmable in the field.

An Elkhart suction relief valve will be supplied and installed between the inlet fitting and the valve with the discharge side of the valve plumbed below the pump house. No threads will be provided on the discharge end to prevent a cap from being installed.

302. PLUMBING - TANK FILL - 2" VALVE

A 2" flexible fill line is to be provided from the pump to the tank. A 1/4 turn 2" Elkhart valve with an electric actuator with built-in electrical stops and a position feedback signal. The unit is water tight, corrosion resistant, and equipped with an emergency override. The opening and closing speed of the valve is pre-set to comply with NFPA recommendations.

An Elkhart UBEC-1 electric valve controller will be supplied on the operator's panel. The controller will have a 10 LED valve position indicator, open/closed switches, and a pre-set button. The valve position indicator will automatically dim during night time operation. The pre-set button is programmable in the field.

303. PLUMBING - 1 1/2" HOSE BED PRECONNECT - FRONT RIGHT

One (1) 1 1/2" right side hose bed discharge outlet will be supplied with a 2" Elkhart valve. Full 2" galvanized plumbing will be provided from the fire pump to the front of the hose bed and terminate in a male threaded opening. The plumbing will not pass through the tank and will be supported on both ends.

Each valve will be supplied with an electric actuator with built-in electrical stops and a position feedback signal. The unit is water tight, corrosion resistant, and equipped with an emergency override. The opening and closing speed of the valve is pre-set to comply with NFPA recommendations.

A pressure sensor will be provided and calibrated for each waterway.

An Intelligent CAF Selector (ICS) will be supplied on the pump operator's panel. The controller will integrate the Elkhart electric valve with a 12-volt solenoid air valve. The controller will have a 10 LED valve position indicator, digital pressure gauge, open/closed switches, CAF on, and CAF select buttons. The valve position indicator will automatically dim during night time operation.

The CAF ON button will provide the following easy to use functionality:

- Press the "CAF ON" button and you have compressed air foam with air and water in the proper proportion
- Press "CAF SELECT" to toggle between three discharge settings; wet, medium and dry
- The ICS display keeps you completely informed of CAF mode and valve position
- Press "CAF ON" again to return to water only mode

The CAF SELECT button will provide the following three modes for easy switching of foam consistency:

- Wet CAF
- Medium CAF
- Dry CAF

The patented direct absolute valve position feedback only available from the Unibody electric valve allows the ICS operator to easily program and select from three CAF modes; wet CAF, medium CAF and dry CAF or water only.

304. PLUMBING - 2 1/2" DISCHARGE - LEFT

Two (2) 2 1/2" left discharge outlets will be supplied. Full 2 1/2" galvanized plumbing will be provided from the fire pump to the left side of the pump panel and will terminate in a chrome plated 30° droop port and cap with plastic coated cord.

Each of the 2 1/2" valves will be supplied with an electric actuator with built-in electrical stops and a position feedback signal. The unit is water tight, corrosion resistant, and equipped with an emergency override. The opening and closing speed of the valve is pre-set to comply with NFPA recommendations.

A pressure sensor will be provided and calibrated for each waterway.

An Elkhart UBEC-2 electric valve controller will be supplied on the operator's panel. The controller will have a 10 LED valve position indicator, digital pressure gauge, open/closed switches, and a pre-set button. The valve position indicator will automatically dim during night time operation. The pre-set button is programmable in the field.

305. PLUMBING - 2 1/2" DISCHARGE - RIGHT

One (1) 2 1/2" right discharge outlet will be supplied. Full 2 1/2" galvanized plumbing will be provided from the fire pump to the PS1 side of the pump panel and will terminate in a chrome plated 30° droop port and cap with plastic coated cord.

Each of the 2 1/2" valves will be supplied with an electric actuator with built-in electrical stops and a position feedback signal. The unit is water tight, corrosion resistant, and equipped with an emergency override. The opening and closing speed of the valve is pre-set to comply with NFPA recommendations.

A pressure sensor will be provided and calibrated for each waterway.

An Elkhart UBEC-2 electric valve controller will be supplied on the operator's panel. The controller will have a 10 LED valve position indicator, digital pressure gauge, open/closed switches, and a pre-set button. The valve position indicator will automatically dim during night time operation. The pre-set button is programmable in the field.

306. PLUMBING - 2 1/2" DISCHARGE - FRONT

One (1) 2 1/2" front left discharge outlet will be supplied. A combination of 2 1/2" galvanized plumbing and Class1 high pressure hose will be provided from the fire pump to the front of the truck. The plumbing will terminate below a slot cut-out in the front bumper apron with a 90° angled full time swivelling port and a removable reducer to 1 1/2".

The slot cut-out will be centered between the front frame rails, below the surface mounted hose compartment.

Each discharge will be supplied with a 2 1/2" Elkhart ball valve with an electric actuator with built-in electrical stops and a position feedback signal. The unit is water tight, corrosion resistant, and equipped

with an emergency override. The opening and closing speed of the valve is pre-set to comply with NFPA recommendations.

A pressure sensor will be provided and calibrated for each waterway.

An Intelligent CAF Selector (ICS) will be supplied on the pump operator's panel. The controller will integrate the Elkhart electric valve with a 12-volt solenoid air valve. The controller will have a 10 LED valve position indicator, digital pressure gauge, open/closed switches, CAF on, and CAF select buttons. The valve position indicator will automatically dim during night time operation.

The CAF ON button will provide the following easy to use functionality:

- Press the "CAF ON" button and you have compressed air foam with air and water in the proper proportion
- Press "CAF SELECT" to toggle between three discharge settings; wet, medium and dry
- The ICS display keeps you completely informed of CAF mode and valve position
- Press "CAF ON" again to return to water only mode

The CAF SELECT button will provide the following three modes for easy switching of foam consistency:

- Wet CAF
- Medium CAF
- Dry CAF

The patented direct absolute valve position feedback only available from the Unibody electric valve allows the ICS operator to easily program and select from three CAF modes; wet CAF, medium CAF and dry CAF or water only.

307. PLUMBING - 2 1/2" DISCHARGE – REAR LEFT

One (1) 2 1/2" rear right discharge outlet will be supplied. Full 2 1/2" galvanized plumbing will be provided from the fire pump to the rear of the body and will terminate in a chrome plated 30° droop port and cap with plastic coated cord. The plumbing will not pass through the water tank and will be supported at either end of the body.

Each of the 2 1/2" valves will be supplied with an electric actuator with built-in electrical stops and a position feedback signal. The unit is water tight, corrosion resistant, and equipped with an emergency override. The opening and closing speed of the valve is pre-set to comply with NFPA recommendations.

A pressure sensor will be provided and calibrated for each waterway.

An Elkhart UBEC-2 electric valve controller will be supplied on the operator's panel. The controller will have a 10 LED valve position indicator, digital pressure gauge, open/closed switches, and a pre-set button. The valve position indicator will automatically dim during night time operation. The pre-set button is programmable in the field.

308. PLUMBING - 2 1/2" DISCHARGE – REAR RIGHT

One (1) 2 1/2" rear right discharge outlet will be supplied. Full 2 1/2" galvanized plumbing will be provided from the fire pump to the rear of the body and will terminate in a chrome plated 30° droop port and cap with plastic coated cord. The plumbing will not pass through the water tank and will be supported at either end of the body.

Each 2 1/2" valves will be supplied with an electric actuator with built-in electrical stops and a position feedback signal. The unit is water tight, corrosion resistant, and equipped with an emergency override. The opening and closing speed of the valve is pre-set to comply with NFPA recommendations.

A pressure sensor will be provided and calibrated for each waterway.

An Intelligent CAF Selector (ICS) will be supplied on the pump operator's panel. The controller will integrate the Elkhart electric valve with a 12-volt solenoid air valve. The controller will have a 10 LED valve position indicator, digital pressure gauge, open/closed switches, CAF on, and CAF select buttons. The valve position indicator will automatically dim during night time operation.

The CAF ON button will provide the following easy to use functionality:

- Press the "CAF ON" button and you have compressed air foam with air and water in the proper proportion
- Press "CAF SELECT" to toggle between three discharge settings; wet, medium and dry
- The ICS display keeps you completely informed of CAF mode and valve position
- Press "CAF ON" again to return to water only mode

The CAF SELECT button will provide the following three modes for easy switching of foam consistency:

- Wet CAF
- Medium CAF
- Dry CAF

The patented direct absolute valve position feedback only available from the Unibody electric valve allows the ICS operator to easily program and select from three CAF modes; wet CAF, medium CAF and dry CAF or water only.

309. PLUMBING - 2 1/2" HOSE BED PRECONNECT - FRONT RIGHT

One (1) 2 1/2" right side hose bed discharge outlet will be supplied, each with a 2 1/2" valve. Full 2 1/2" galvanized plumbing will be provided from the fire pump to the front of the hose bed and terminate in a male threaded opening. The plumbing will not pass through the tank and will be supported on both ends.

Each of the 2 1/2" valves will be supplied with an electric actuator with built-in electrical stops and a position feedback signal. The unit is water tight, corrosion resistant, and equipped with an emergency override. The opening and closing speed of the valve is pre-set to comply with NFPA recommendations.
A pressure sensor will be provided and calibrated for each waterway.

An Elkhart UBEC-2 electric valve controller will be supplied on the operator's panel. The controller will have a ten (10) LED valve position indicator, digital pressure gauge, open/closed switches, and a pre-set button. The valve position indicator will automatically dim during night time operation. The pre-set button is programmable in the field.

310. PLUMBING - 4" DISCHARGE WITH 4" ELECTRIC VALVE - RIGHT

One (1) 4" discharge with 4" valve will be supplied and plumbed directly from the fire pump with 4" galvanized pipe and will terminate at the left side of the PS1 panel. This outlet will be supplied with a 4" storz fitting with 30° droop and cap with a plastic coated cord.

Each of the valves will be supplied with an electric actuator with built-in electrical stops and a position feedback signal. The unit is water tight, corrosion resistant, and equipped with an emergency override. The opening and closing speed of the valve is pre-set to comply with NFPA recommendations.

A pressure sensor will be provided and calibrated for each waterway.

An Elkhart UBEC-2 electric valve controller will be supplied on the operator's panel. The controller will have a 10 LED valve position indicator, digital pressure gauge, open/closed switches, and a pre-set button. The valve position indicator will automatically dim during night time operation. The pre-set button is programmable in the field.

311. PLUMBING - 3" MONITOR PLUMBING

One (1) 3" monitor discharge will be supplied with a 3" valve and plumbed directly from the fire pump with 3" galvanized pipe. The plumbing will terminate overtop of the fire pump, offset to the passenger side of the storage area located ahead of the pre-connect hose bed area. This outlet will terminate with a 3" NPT cap in for use with the customer supplied monitor.

Each of the 2 1/2" valves will be supplied with an electric actuator with built-in electrical stops and a position feedback signal. The unit is water tight, corrosion resistant, and equipped with an emergency override. The opening and closing speed of the valve is pre-set to comply with NFPA recommendations.

A pressure sensor will be provided and calibrated for each waterway.

An Elkhart UBEC-2 electric valve controller will be supplied on the operator's panel. The controller will have a ten (10) LED valve position indicator, digital pressure gauge, open/closed switches, and a pre-set button. The valve position indicator will automatically dim during night time operation. The pre-set button is programmable in the field.

312. WATER TANK - STANDARD - Minimum 500 to a Maximum 750 IMPERIAL GALLON COPOLY

The tank will be constructed from U.V. stabilized, stress relieved copolymer polypropylene and is manufactured to the highest of industry standards. The outer shell, the lid, and the center baffles will be fabricated using a minimum 1/2" thick material, with the cross baffles and gussets a minimum of 3/8". All baffles and gussets extend from the floor of the tank to the lid. All tanks will incorporate thermoformed edges wherever possible to ensure maximum strength. The booster tank fill tower and sump box are constructed of 1/2" thick material and located as specified or as required will be min. 18" X 18". The fill tower is fitted with a removable screen and hinged lid, while the sump box will be fitted with a screen and 3" NPT drain. All booster tanks are fitted with a minimum of 2 1/2" suction outlet that draws directly from the sump box. All suction and fill fittings are machined with a minimum schedule 80 rating. All materials and components incorporated inside the tank are FDA approved allowing the tank to be used for potable water.

The longitudinal and horizontal baffles will be continuously welded in an interlocking design that allows proper venting during filling and suction. The lid is completely removable via countersunk stainless steel hardware and sits flush inside the outer wall of the tank. The lid will be fully supported by a minimum of 1 ½" by 1" inside flange. All hardware used on the top of the lid, including the lifting lugs, will sit flush with the surface of the lid.

A vent pipe with a minimum inside diameter of 4" will be fabricated and installed from the fill tower through the baffles and exits out the bottom at a location specified by the customer. A secondary vent

of ¾" vent pipe is installed around the top of the inside perimeter of the tank and is vented out the fill tower. This allows for maximum filling when the tank is on a slope. All welds are injection or nitrogen gas welded using state of the art welding equipment.

All booster tanks will have a serial number, model number and date of manufacture engraved on the tank. A lifetime warranty certificate supplied with the tank.

313. COMPRESSED AIR FOAM - WATEROUS 200-SP

A Waterous 200-SP compressed air foam system shall be installed to provide compressed air foam to the specified discharges. It shall be capable of providing naturally aspirated foam solution or compressed air foam from any of the specified CAFS discharges simultaneously. The consistency of the compressed air foam shall be individually adjustable to each discharge outlet.

The air compressor shall be driven by the chassis engine utilizing a "hot shift" Transmission PTO. The compressor air end shall be of the oil flooded rotary screw type, designed to supply a minimum of 200 SCFM of free air at maximum CAFS operating RPM. The compressor shall incorporate an integral gearbox with oil lubricated helical gears. The gear ratio shall be approximately 3:1 over the input shaft speed. The air compressor drive system shall be designed to operate the air end at maximum RPM when the water pump is developing 130 to 140 PSI in a "no flow" state. The completed compressor system shall be capable of maintaining prolonged pressures from 100 to 150 lbs. per square inch throughout its service life.

A pneumatic modulating inlet valve mounted on the air end inlet shall control the compressor. This controller shall sense air pressure and control the air delivery of the air end while maintaining constant pressure. An Auto Sync balancing system shall be provided to maintain the air pressure within plus or minus 5% of the water pump pressure, throughout the pressure range. Auto Sync controls shall be installed on the pump operator's panel with the following operating modes:

AUTOMATIC:	Air pressure matched to water pump pressure.
FIXED:	Air pressure defaults to manual setting on compressor mounted control valve
UNLOAD:	Air pressure reduced to 40 PSI for standby operations

All oil shall be routed in wire braided hose conforming to SAE 100R1 Standards for hydraulic hose. Air control hoses shall be SAE J844 push-on type, color coded to simplify trouble shooting. The compressor system sump/pressure vessel shall be constructed entirely of stainless steel, in compliance with the requirements of ASME Boiler and Pressure Vessel Code. The sump/pressure vessel shall be equipped with an oil level sight glass, drain valve, air pressure relief valve and 1.5" threaded brass oil fill cap.

The air compressor system shall feature a spin-on, full flow oil filter unit and a thermostatic valve to control oil flow to the cooler. This thermostat shall maintain the system oil temperature within 160° to 225° Fahrenheit range.

A modular air/oil separator unit with spin-on element shall be provided and installed in close proximity to the sump. Replacement elements for oil filter and separator shall be rapidly available.

The compressor shall be cooled by the apparatus fire pump, utilizing a shell and tube heat exchanger constructed of copper and brass. Water shall flow through the heat exchanger whenever the fire pump is operating. An in-line strainer shall be installed on the water inlet side of the heat exchanger to prevent clogging. The strainer shall be removable for cleaning. The compressor cooling system shall be capable of maintaining recommended operating temperatures throughout its full operating range at ambient temperatures up to 115 degrees Fahrenheit. A "fail safe" switch shall be provided to preclude engagement of the compressor PTO unless the fire pump is engaged.

A foam manifold with an integral paddlewheel flow sensor shall be installed by the apparatus manufacturer to distribute foam solution to the designated foam discharges. A check valve is provided at the inlet end of the foam manifold to prevent foam solution back-flow into the pump. All added foam discharge piping shall be stainless steel and/or high-pressure wire braid reinforced hose with stainless fittings.

Each compressed air foam discharge shall be equipped with individual corrosion resistant check valves on both the water and compressed air plumbing that prevent back-flow of foam solution

Shall be installed by the apparatus manufacturer to distribute foam solution to the designated foam discharges. A check valve is provided at the inlet end of the foam manifold to prevent foam solution back-flow into the pump. All added foam discharge piping shall be stainless steel and/or high pressure wire braid reinforced hose with stainless steel fittings.

Each compressed air foam discharge shall be equipped with individual corrosion resistant check valves on both the water and compressed air lines that prevent back-flow of foam solution, air and/or compressed air foam into the pump, air lines or foam proportioning system.

All components of the piping system exposed to pressurized air from the CAFS shall be designed for at least 500 PSIG burst pressure.

The following CAFS controls and instruments shall be provided on the pump operator's panel, arranged in a logical and operator friendly manner:

- Auto Sync compressor controls (Auto/Manual, Run/Unload) with engraved instruction plate:
- Air compressor temperature gauge with warning light and audible alarm
- CAF system air pressure gauge

Two (2) copies of operation and maintenance manuals shall be provided to the purchaser with the unit. Manuals shall include detailed instructions in the operation and maintenance of the overall unit, water pump and air compressor system.

314. FOAM SYSTEM - FOAMPRO 2001 - SINGLE

The apparatus shall be equipped with an electronic, fully automatic, variable speed, direct injection and discharge side foam proportioning system. The system shall be capable of handling either Class A foam concentrates or most Class B foam concentrates. The foam proportioning operation shall be based on direct measurement of water flows, and remain consistent within the specified flows and pressures. System must be capable of delivering accuracy to within 3% of calibrated settings over the advertised operation range when installed according to factory standards.

The system shall be equipped with a digital electronic control display suitable for installation on the pump panel. Incorporated within the control display shall be a microprocessor that receives input from

the system flowmeter, while also monitoring foam concentrate pump output, comparing values to ensure that the operator pre-set proportional amount of foam concentrate is injected into the discharge side of the fire pump.

A paddlewheel-type flowmeter shall be installed in line with the manifold feeding discharges specified to be “foam capable.”

The digital computer control display shall enable the pump operator to perform the following control and operation functions for the foam proportioning system:

- Provide push-button control of foam proportioning rates from 0.1% to 9.9%, in 0.1% increments
- Show current flow-per-minute of water
- Show total volume of water discharged during and after foam operations are completed
- Show total amount of foam concentrate consumed
- Simulate flow rates for manual operation
- Perform setup and diagnostic functions for the computer control microprocessor
- Flash a “low concentrate” warning when the foam concentrate tank runs low
- Flash a “no concentrate” warning and shut the foam concentrate pump off, preventing damage to the pump, should the foam tank(s) empty

A 12-volt electric motor drive positive displacement foam concentrate pump, rated up to 2.5 gpm (9.5 L/min) @ 150 PSI with operating pressures up to 400 PSI (27.6 BAR), shall be installed in a suitable, accessible location. The system will draw a maximum of 40 amps @ 12 VDC. A pump motor electronic driver (mounted to the base of the pump) shall receive signals from the computer control display and power the 1/2 hp (0.40 Kw) electric motor directly coupled to the concentrate pump in a variable speed duty cycle to ensure that the correct proportion of concentrate pre-set by the pump operator is injected into the water stream.

Full flow check valve shall be provided to prevent foam contamination of fire pump and water tank or water contamination of foam tank. Components of the complete proportioning system shall include:

- Operator control and display
- Paddlewheel flowmeter
- Pump and electric motor/motor driver
- Wiring harnesses
- Low level tank switch
- Foam injection check valve
- Main waterway check valve

An installation and operation manual shall be provided for the unit, along with a one-year limited warranty by the manufacturer. The system must be installed and calibrated by a Certified FoamPro Technician.

The system design shall have passed environmental testing which simulates heavy use on off-road mobile apparatus. Testing shall have been conducted in accordance to SAE standards.

315. <u>FOAM SYSTEM - MANIFOLD FOR THREE (3) FOAM OUTLETS</u>

A foam manifold for three (3) outlets will be supplied with the apparatus to feed the following discharges:

One (1) 1 1/2" hose bed pre-connect

One (1) 2 1/2" front discharge
One (1) 2 1/2" rear right discharge

316. FOAM TANK - INTERNAL - 30 IMPERIAL GALLON COPOLY

One (1) 30 imperial gallon foam concentrate tank will be supplied integral with the poly water tank. The tank shall be constructed of materials compatible with foam concentrates.

The foam tank will not impact or affect the water tank volume.

317. BODY - 200" PUMPER/RESCUE - DOUBLE HIGH SIDE

The body is engineered to provide correct weight distribution on the chassis and is built in accordance with the current requirements published by Underwriters" Laboratory of Canada.

The aluminum body will be separate from the cab body to allow for natural frame flex and will have the capability of being removed from the vehicle by unbolting the module from the chassis frame. The body will be fabricated from 1/8" H5052 H32 aluminum sheet and 6061-T6 extrusions utilizing long sheet forming techniques. The top and ends of the body sides will be reinforced with 2" x 2 7/8" extrusion to provide rigidity.

Wheel Well Liners

Full width aluminum wheel well liners will be provided to keep water and road salt away from the body. The liners will be bolted in using stainless steel bolts and the liner will be completely removable to provide access to the rear spring shackles.

Aluminum Checker plate

Hi-Shine 1/8" NFPA aluminum checker plate will be used on the compartment tops as standard.

Sub Frame

The body will be mounted to the chassis on a steel, 1/4" wall, tubular sub-frame. The sub-frame will also be attached to the chassis by four flanged mounts, using 1" diameter grade eight bolts and nuts.

The sub-frame will consist of two longitudinal 4" x 4" tubes laid on the chassis frame and four transverse body support members. The forward body mount will be an 80" long x 4" x 2" cross member, the two center supports will measure 86" x 4" x 2" and the rear support will measure 46" x 4" x 2". Two (2) additional 4" x 2" cross members will be provided mid-way between the longitudinal tubes. The sub-frame will be completely sealed in epoxy prior to installation on the body.

Handrails

Extruded aluminum handrails fitted with inlaid rubber strips for improved grip, and not less than 1 1/4" outside diameter are provided where necessary on the body with a minimum of two vertical on the rear body face.

Where possible each handrail will have an LED light strip inset on the back side to assist with illuminating the rear body area. These lights will be activated with the park brake.

Compartments

The side compartments shall be formed from individual compartment assemblies welded together into a unitized structure. The structure shall be designed with minimal parts to reduce the amount of welding required and minimize stress concentrators. The corner compartments front, rear outside and full depth

inside wall shall be constructed from a single sheet of material. The formed forward, rearward compartments and wheel well assembly shall then be welded with a single compartment ceiling across all compartments. Each of the compartments will be sealed to prevent moisture from entering the structure. The roof will be capped with checker plate complete with an integral formed drip rail. Stainless steel overlays with a brushed finish will be provided on the front face of each body side face. Each overlay will extend the full height of the compartment exterior face and will wrap around the corner 1" to provide a finished appearance while protecting the body and paint from damage.

The rear face spanning between the body sides will be flush with the body side ends. A rear facing compartment will be formed in the same fashion as the side compartments and welded into an opening cut into the rear face.

The body side compartment tops will be level with the top of the main hose bed with the inner face smooth and free from protrusions.

Within each compartment, whether ahead of or behind the rear wheels shall be of double wall construction. This shall provide a protected mounting area for electrical nodes and other recessed components if applicable. Easily removable access panels shall be provided for maintenance purposes.

A large sweep out leading edge will be formed integral with each compartment floor. This sweep out shall create a sealing surface at the bottom of the door and shall prevent any water at the door from running back into the compartment. Compartments without sweep outs may form water traps and are therefore not acceptable.

Nine (9) compartments will be provided, four on left side, four on the right side and one rear facing. For the purpose of clarity, the side facing compartments will be labeled DS1, DS2, DS3 and DS4 for the driver side; PS1, PS2, PS3, and PS4 for the passenger side. The rear compartment will be labeled RR. The compartments will have the following dimensions:

		Door Size:	Clear Opening:	Compartment Interior:
DS Side -	DS1	53" X 69½"	51" X 64½"	53" X 73" X 14"
	DS2	36" X 69½"	34" X 64½"	39" X 73" X 26"
	DS3	60" X 39½"	58" X 34½"	60" X 43" X 26"
	DS4	36" X 69½"	34" X 64½"	39" X 73" X 26"
PS Side -	PS1	53" X 69½"	51" X 64½"	53" X 73" X 14"
	PS2	36" X 69½"	34" X 64½"	39" X 73" X 26"
	PS3	60" X 39½"	58" X 34½"	60" X 43" X 26"
	PS4	36" X 69½"	34" X 64½"	39" X 73" X 26"
Rear -	RR	48" X 54½"	46" X 49½"	48" X 58" X 10"

Compartment Flooring

All compartments where no permanently fixed trays or heavy equipment are located, removable plastic interlocking tiles will be supplied to allow air to circulate and to protect the compartment floor.

Compartment Reinforcement

The bottom of all lower compartment floors will be reinforced, to prevent "oil canning".

Compartment Vents
Each compartment will be supplied with an air vent, recessed into the wall, to allow air to circulate and to allow moisture to escape.

Compartment Lights
Each side and rear facing compartment will be provided with Amdor Luma Bar LED compartment lights. They will be installed in each corner adjacent to the door opening to provide lighting the full height of the compartment.

Hose Bed Compartment
The hose bed will be located above the water tank and will as a minimum meet with U.L.C. requirements for hose bed volume with a minimum length of 140 inches. The floor of the bed will be provided with removable, interlocking plastic Versatile grating to allow air flow to the hose. A large formed aluminum open storage area will be provided at the front of the hose bed allowing separation between the water tank fill towers and the main hose bed area. The storage area will extend between the hose bed and the front body face.

Two sets of tracking will be provided along the forward face of the hose bed and a single track along the rear edge of the hose bed to allow the installation of fully adjustable dividers.

Rear Tailboard
The complete tailboard assembly will be bolted to the body using 1/2" spacers to allow for drainage and removal if damaged. Heavy-duty aluminum 3" x 3" x 3/16" angle and 3" x 2" x 3/16" edge extrusion will form the framework and substructure to provide a very rigid and strong standing platform for firefighters. The sub frame will be covered with 1/8" high shine NFPA aluminum tread plate.

318. BODY - DOORS - ROLL UP - AMDOR

Amdor brand roll-up doors complete with 1” aluminum double wall slats, each with continuous ball & socket hinge joints and recessed dual durometer slat seals will be supplied for each of the side and rear main body compartments. Each door will have double wall reinforced bottom panels with stainless steel lift bar latching systems. The bottom panel flange will be supplied with cut-outs for ease of accessing the lift bar with gloved hands.

Each door will have reusable slat shoes with positive snap-in securement, a smooth interior door curtain to prevent equipment hang-ups, one-piece aluminum door track/side frame, a top gutter with non-marring seal, as well as non-marring side and bottom seals. All wear component material will be type 6 nylon.

A proprietary reader module will be mounted along a lower door frame in for each compartment with a door slat equipped with a magnetic red end-shoe. The switch will be used to trigger the door ajar system.

319. BODY - HOSE BED DIVIDER - 1/8" ALUMINUM

Four (4) hose bed dividers will be supplied to provide division of the main hose bed to suit the customer’s hose lay requirements. Each divider will be constructed of 1/8" aluminum sheet and will be mounted to the three adjustable tracks. Aluminum tubing will be welded along the top and end of the divider, for extra strength and to avoid any sharp edges. A handhold shall be cut in the end of the hose bed divider.

The dividers will be set to allow for the following hose load configuration left to right:
Open as a walking area
500 feet of 4” hi-vol hose
500 feet of 4” hi-vol hose
250 feet of 2 1/2" hose
200 feet of 1 3/4" hose

320. BODY - HOSE BED COVER - VINYL WITH SHOCK CORD - LARGE

A cover will be provided and mounted over the main hose bed area. The cover will be black vinyl complete with shock-cord down the sides of the hose bed area with Velcro straps at the rear. The strap will be complete with a loop large enough to grasp with a gloved hand.

The cover will be large enough to accommodate the ladder storage compartment opening at the rear of the apparatus to meet customer specifications to be determined at pre-construction time.

321. BODY - SCBA STORAGE - 8 IN SIDE COMPARTMENT

The floor section of the compartment over the left body side fender will be used for the storage of eight (8) SCBA cylinders. The complete storage area for the cylinders will be semi recessed into the floor, side by side, at an angle, depth wise into the body to prevent the bottles from shifting or sliding. A formed divider will be provided between each individual bottle storage spot to keep the bottles from rolling side to side. Carpet will be installed to protect the cylinders from any damage.

322. BODY - STORAGE - BASKET STRETCHER & BACK BOARD

A storage pocket for back boards and a basket stretcher on edge will be provided through from the PS1 compartment to the DS1 compartment, ahead of the respective pump access panels. Min. 25” high and min 20” wide. The storage area will be fully closed off from the pump compartment but will be removable with basic hand tools.

The floor of the storage area will be lined with Teflon for ease of loading and unloading. Velcro retention straps will be provided on each end to keep the equipment stowed.

323. BODY - REAR STORAGE - ATTIC LADDER AND TWO (2) PIKE POLES

At the rear of the body, there will be a storage compartment complete with tubes to house one 10-foot collapsible attic ladder and two pike poles. The compartment will have a hinged checker plate door with latch to enclose the equipment.

324. BODY - HANDRAIL - KNURLED (EACH)

One (1) additional handrail will be installed on the top of the left side body compartments, towards the rear of the body to assist with entering and exiting the main hose bed. Each handrail will be extruded aluminum with an aggressive knurled finish, and not less than 1 1/4" outside diameter.

325. BODY - STEP - FULL WIDTH (EACH)

An aluminum checker plate full width hood step will be located immediately below the main hose bed and above the RR compartment to assist with the loading of hose. This step will be in addition to any other steps provided and will have an Amdor Luma Bar H2O LED light mounted along the underside to assist with illuminating the area below.

326. BODY - STEP - ACCESS LADDER - ZICO QUIC LADDER - 3096

A Zico 3096 Quic Ladder will be supplied and installed on the left rear body face of the apparatus to allow access to the main hose bed area. The Quick ladder is stored parallel to the body when in the folded position with the use of a locking handle. The Quic Ladder allows a more comfortable climbing angle by releasing the locking handle and pulling the folded section down. The ladder automatically latches and will not retract until the scissor lock is raised. The configuration will be specific to the design and requirements of the apparatus. Cast aluminum rungs with a flat, non-skid surface measuring 3" deep x 12 1/2" wide will be used for the length of the ladder. The handrails will be 1-1/4" heavy walled aluminum tubing, covered between rungs by ribbed black neoprene tubing that provides a firm gripping surface.

327. BODY - TAILBOARD - SLIDE OUT STEP

To provide additional safety and to increase the ease of loading and unloading the hose, the tailboard will be built to slide out and give more step space.

An ajar switch will be fabricated and wired to the existing door ajar warning system. A light will be supplied in the cab to warn the operator when the doors are not stowed properly.

328. BODY - TRAY - SLIDE OUT - 70% EXTENSION

Three (3) roll out trays will be installed in the specified compartments. Each tray will be constructed from 3/16" aluminum and will be attached to a pair of rollout sliders rated for Min 250lb. The tray will be able to extend 70% of the sliders length and will have a 2" return lip around the perimeter with welded corners to give additional strength. A single gas shock will be installed below the tray to hold it in the stowed and extended positions.

Each tray will be lined with removable rubber tile to allow for air circulation. Reflective red and white conspicuity striping will be applied to as much of the outward exposed faces of each tray as possible.

Mounted in the following compartments:
One (1) in compartment DS2
One (1) in compartment DS4
One (1) in compartment PS2

329. BODY - DIVIDER - SLIDE OUT - 70% EXTENSION - 700LB, MEDIUM (EACH)

Two (2) roll out vertical dividers will be installed in the PS4 compartment. Each divider will be constructed from 3/16" aluminum and will be attached to aluminum Slide Master Slider rated for 700 lb. distributed weight capacity. The divider will be able to extend 70% of the sliders length in a single direction with a hand hold cut out large enough for a gloved hand. If equipment mounting doesn't allow for the cut out a formed 1" lip will be provided. Top guides lined with Teflon will be provided to ensure the divider travels smoothly to and from the stowed position. A pair of spring latches will be installed at the bottom of the tray to hold the divider in the stowed and extended positions.

Tracking will be provided at the top and bottom of the compartment to allow adjustment side to side.

Reflective red and white conspicuity striping will be applied to either side of the leading edge of each divider. The stripe will run the height of the divider.

330. BODY - DIVIDER - SWING OUT - GEAR GRID - DUAL

One (1) Gear Grid swing out tool board system will be installed in the PS3 compartment. The system will include two separate swing out panels that close one over the other. Each panel will have a poly positive retention to keep the respective divider in the stowed position. A gas shock will be supplied on each divider to hold the divider open.

A flashing light will be provided on the ends of each swing out panel.

The system will include a stationary panel mounted directly to the rear wall of the compartment giving an additional layer for equipment storage.

331. BODY - SHELF - ADJUSTABLE - 3/16" - SMALL (EACH)

Seven (7) adjustable shelves will be supplied and installed in the specified compartments complete with tracking. Each shelf will be constructed form 3/16" aluminum plate with a 2" return lip around the perimeter with welded corners to give additional strength.

Each tray will be lined with removable rubber tile to allow for air circulation. Reflective red and white conspicuity striping will be applied to as much of the outward exposed face of each tray as possible.

Mounted in the following compartments:
Two (2) in compartment DS2
One (1) in compartment DS3
Two (2) in compartment DS4
Two (2) in compartment PS2

332. BODY - FENDERETTES - POLISHED ALUMINUM

The rear body fenders will be trimmed with polished aluminum fenderettes.

333. BODY - TOW LOOPS - REAR (PAIR)

One (1) pair of chrome tow loops will be mounted through the rear lower suction and discharge panel inside the RR compartment. A polished aluminum trim will be provided around each opening through the wall to provide an aesthetically pleasing finish.

334. BODY - BRACKET - AXE (EACH)

Two (2) aluminum formed axe mounts and brackets will be provided and mounted. Exact locations to be determined.

335. BODY - BRACKET - CROWBAR (EACH)

One (1) crowbar bracket will be supplied and mounted. Exact location to be determined.

336. BODY - BRACKET - WHEEL CHOCKS (EACH)

One (1) set of brackets will be constructed and installed on the rearward wall of the DS1 compartment for the storage of one (1) pair of wheel chocks.

337. BODY - BRACKET - TRAFFIC CONES (EACH)

One (1) custom bracket will be fabricated and installed in the specified compartment for the storage of stacked cones. Exact location to be determined.

Fire extinguish bracket
20 lb Ansel Cartridge type supplied by EFD - Exact locations to be determined.

338. LADDER - REAR - MAIN HOSE BED AREA
A custom storage chute opening to the rear will be provided in the main hose bed area complete with a retention strap. The interior of the chute will be custom fabricated to store the specified ladders vertically on end in individual channels sized for the specific ladder. Each channel will be lined with Teflon to assist with loading and unloading with rear roller.

339. SUCTION HOSE STORAGE - COMPARTMENT IN REAR BODY
Three (3) separate custom storage chutes, each opening to the rear, will be installed complete with hinged doors and latches. Each compartment will be fabricated to store one of the hard suction hoses in the equipment list.

340. ELECTRICAL - WIRING DIAGRAM
The completed apparatus will be delivered with an "as built" wiring diagram which will show individual wire colors, wire gauges, and describe all major components and accessories supplied.

341. ELECTRICAL - BASE WIRING - PUMPER
All 12-volt electrical equipment installed by the apparatus manufacturer shall conform to modern automotive practices. Particular attention will be paid to the design of the vehicle electrical system to ensure that it will perform in high moisture and road salt environments normally encountered in Canada. All wiring shall be stranded copper or copper alloy conductors of a gauge rated to carry 125 percent of the maximum current for the protected circuit. Voltage drops in all wiring from the power source to the device shall not exceed 10%. The wiring, wiring harness and insulation shall be in conformance to applicable SAE and ULC standards with SXL and GXL temperature properties. Any exposed wiring shall be protected in a loom with a minimum 285°F rating. All wiring looms shall be properly supported and attached to body members. The electrical conductors shall be constructed in accordance with applicable SAE standards, except when good engineering practice requires special construction.

The wiring connections and terminations shall use a method that provides a positive mechanical and electrical connection and shall be installed in accordance with the device manufacturer's instructions. Electrical connections shall be with mechanical type fasteners and large rubber grommets where wiring passes through metal panels. Automatic reset circuit breakers shall be provided which conform to SAE Standards. Wiring shall be color coded. Exterior exposed wire connectors shall be environmentally sealed to withstand elements such as temperature extremes, moisture and automotive fluids. There shall be no exposed electrical cabling, harnesses, or terminal connections located in compartments, unless they are enclosed in a junction box, covered with a removable electrical panel or wrapped in a protective loom. The wiring shall be secured in place and protected against heat, liquid contaminants and damage.

Any holes made in the roof shall be caulked with silicon. Large fender washers, liberally caulked, shall be used when fastening equipment to the underside of the cab roof. When an electrical component is installed in an exposed area shall be mounted in a manner that shall not allow moisture to accumulate in it. Exposed area shall be defined as any location outside of the cab or body. Electrical components designed to be removed for maintenance shall have a coil of wire provided behind the appliance allowing them to be pulled away from mounting area for inspection and service work. Corrosion preventative compound shall be applied to all terminal plugs located outside of the cab or body. All

non-waterproof connections shall require this compound in the plug to prevent corrosion and for easy separation (of the plug).

All reflectors, directional and clearance lights required to comply with Transportation Canada Standards, shall be furnished. Rear identification lights at the tailboard level shall be recessed mounted for protection. Lights and wiring mounted in the rear bulkheads shall be protected from damage by installing a false bulkhead inside the rear compartments.

An operational test shall be conducted to ensure that any equipment that is permanently attached to the electrical system is properly connected and in working order.

Heat Shrink Tubing
As standard, all terminals exposed to the environment will be crimped and sealed with heat shrink tubing.

Load Test on Circuits
All body electrical circuits will have a load test applied to ensure that no components/accessory will draw more than 80% of the circuit breaker rating.

Warning Buzzer
A buzzer system will be provided from the rear of the vehicle to the cab to assist the driver when starting, stopping or backing up the vehicle. A buzzer will be located in the cab and a push button will be located at the rear of the vehicle.

342. ELECTRICAL - RECEPTACLE - AUTO EJECT - KUSSMAUL 30 AMP - 110V

One (1) Kussmaul Super Auto Eject deluxe automatic power line disconnect will be supplied and installed over the left side cab wheel well complete with yellow weatherproof cover. Each receptacle will be configured for a 30 amp, 110-volt shoreline power source with a mating connector supplied loose. The Super Auto Eject will be connected to the starter circuit so that the receptacle is ejected upon engine start-up.

The receptacle will be wired to the both the Kussmaul AutoPump and Xantrex combination battery charger/inverter.

343. ELECTRICAL - AIR COMPRESSOR - KUSSMAUL - AUTO PUMP - 110V

A Kussmaul Auto Pump 120-volt air compressor will be supplied and installed on the apparatus for maintaining the air pressure in the air brake system. The compressor will be supplied with an integral pressure switch allowing automatic activation and shall be capable of .76 CFM open flow and a maximum pressure of 100 PSI.

344. ELECTRICAL - SIREN - PRE-WIRE

A prewired circuit including separate breaker will be provided from the cab center dash electrical junction to the extended front bumper of the cab with a 5” coil tucked away to prevent damage. All wire ends will be blunt cut and sealed from the weather until ready for use by the customer.

The circuit wiring and breaker will be sized for use with a customer installed Federal Signal Q2B mechanical siren.

345. ELECTRICAL - MOBILE RADIO - CUSTOMER SUPPLIED RADIO

The customer supplied mobile radio will be installed in the cab complete with roof mounted antenna.

346. ELECTRICAL - INTERCOM - FIRECOM SYSTEM - 6 POSITIONS

A six (6) position Firecom 5100D intercom system will be supplied and installed in the cab. Wiring will be provided between the intercom and the specified mobile radio. The system will include two (1) UHW-505 wireless headsets complete with charger base stations mounted one near the driver and one near the officer positions. Each headset will have a PTT button integral to the ear cup. Five (5) UH-54 headsets complete with wired jacks will be supplied, one for each of the rear cab crew positions.

Hooks will be provided for each of the headsets near the respective seating position. (Customer supplied one (1) wireless and two (2) wired).

347. ELECTRICAL - 12V POWER POINT - KUSSMAUL - USB DUAL (EACH)

Two (2) Kussmaul 12-volt universal serial bus (USB) power points will be supplied and installed in the cab as directed. Each power point will provide two USB ports, each port rated for 2.1 amps and will be wired battery direct.

Mounted at the following locations:

-Two (2) on the right side switch panel

348. ELECTRICAL - DOOR AJAR WARNING SYSTEM - SIDE BODY

An automatic door ajar system will be supplied, which will activate the respective main side and rear body compartment lights when the door is open. A door ajar light and buzzer will be mounted in the cab. The light will be in clear view of the driver and will come on with the buzzer when any side or rear compartment door is open and the park brake is disabled. The system will be disabled when the parking brake is applied.

349. ELECTRICAL - GROUND LIGHT - AMDOR LUMA BAR - 40" LED (EACH)

Three (3) Amdor Luma Bar H2O 40" LED ground lights will be installed under both the left and right body edges forward of the rear axle, and the rear tailboard for extra ground lighting for those vehicles that will be operating in dark areas. The lights will be activated with the park brake only.

350. ELECTRICAL - SIDE BODY - WHELEN 500 - TIR6 SUPER LED (PAIR)

One (1) pair of Whelen 500 series TIR6 super LED surface mounted warning lights will be installed. Each light shall be mounted with two screws to the side of the tailboard with a chrome flange and rubber grommet. The light shall be 1 5/8" high by 5" wide and have a profile of 1 1/8" beyond the mounting surface. Wiring shall extend from a weatherproof strain relief at the rear of the lamp head.

Each light shall have six red super LEDs and shall operate at 12 volts DC, drawing 0.63 amps. The lens shall be red in colour.

351. ELECTRICAL - SIDE BODY - WHELEN 600 - SUPER LED (PAIR)

One (1) pair of Whelen 600 super LED surface mounted warning lights will be installed. Each light shall be mounted with four screws to the side of the body with a chrome flange and rubber grommet. The light shall be 4 1/8" high by 6 1/2" wide and have a profile of 1 7/16" beyond the mounting surface. Wiring shall extend from a weatherproof strain relief at the rear of the lamp head.

Each light shall have eight red super LEDs and shall operate at 12 volts DC, drawing 1.4 amps. The lens shall be red in colour.

352. ELECTRICAL - REAR BODY - WHELEN 600 - SUPER LED (PAIR)

One (1) pair of Whelen 600 super LED surface mounted warning lights will be installed. Each light shall be mounted with four screws to the rear of the body in the spare opening provided in each tail light bezel. The light shall be 4 1/8" high by 6 1/2" wide and have a profile of 1 7/16" beyond the mounting surface. Wiring shall extend from a weatherproof strain relief at the rear of the lamp head.

Each light shall have eight red super LEDs and shall operate at 12 volts DC, drawing 1.4 amps. The lens shall be red in colour.

353. ELECTRICAL - TAIL LIGHTS - WHELEN 600 - LED/HALOGEN (PAIR)

A pair of Whelen 600 series tail lights will be supplied mounted in a Cast4 bezel. Each assembly will include Whelen LED stop lights, LED turn lights, halogen backup lights and a mounting location for a 600 series warning light.

354. ELECTRICAL - ROTATORS - WHELEN L31H SUPER LED (PAIR)

A pair of Whelen L31H red super LED, low profile beacons will be supplied and installed at the upper rear portion of the body. Each light will measure 4 1/64" in height and will be capable of producing a simulated rotating flash pattern when activated.

These lights will be wired as cruise lights set to activate at a low intensity when the marker lights are activated and the apparatus is not in response mode.

355. ELECTRICAL - HOSE BED - AMDOR LUMABAR - 40" LED (EACH)

One (1) Amdor Luma Bar H2O LED light will be mounted to an aluminum angle along the front edge of the main hose bed in order to illuminate the length of the main hose bed. A switch will be provided on the rear body face.

356. ELECTRICAL - CLEARANCE LIGHT - TRUCK LITE - LED (EACH)

Truck Lite LED clearance, marker and indicator lights will be provided as required by Canadian Motor Vehicle Safety Standards. The lower clearance lights mounted at the rear of the body will be recessed into the edge of the tailboard extrusion to reduce the chance of damage to the lights. If the apparatus exceeDS25” in overall length, one (1) pair of side body marker LED lights will be supplied and installed.

357. ELECTRICAL - CLEARANCE LIGHT - WELDON - LED (EACH)

Weldon LED combination marker and clearance indicator lights will be provided one each side of the body in the fender area.

358. ELECTRICAL - BROW LIGHT - RIGID INDUSTRIES E-SERIES LED - 40" SPOT/FLOOD

One (1) Rigid Industries SR series low profile combination spot and flood light bar will be supplied and mounted above the cab side doors, one light each side. Each light will measure 40” in length and 1 5/8” in height. Each light will have an extruded aluminum housing with integral thermal management and a durable polycarbonate lens.

Each light shall have 40 Lids and shall operate at 12 volts DC, drawing 11 amps. The light will have a GORE® pressure equalizing vent.

The light will be centered on the front of the roof, forward of the light bar. A switched will be provided in the cab.

359. ELECTRICAL - SCENE LIGHT - SURFACE - FRC - SPECTRA 900 LED (PAIR)

Three (3) pairs of Fire Research Spectra LED surface mounted flood and loading lights will be installed. The light shall be mounted with four (4) screws to a flat surface. It shall be 6 3/4" high by 9" wide and have a profile of less than 1 3/4" beyond the mounting surface. Wiring shall extend from a weatherproof strain relief at the rear of the lamp head.

Each light shall have twenty-four (24) white LEDs and shall operate at 12 volts DC, draw 6 amps and generate 7,000 lumens of light. The lens shall redirect the light along the vehicle and out onto the working area. The lamp head housing shall be aluminum with a chrome colored bezel.

The lights will be switched in the cab with independent switches for each side of the apparatus.
Mounted at the following locations:
One (1) pair on the left body side, one light in each upper corner
One (1) pair on the right body side, one light in each upper corner
One (1) pair on the rear body side, one light in each upper corner, additionally wired to reverse

360. ELECTRICAL - PULL UP LIGHTS

Two (2) LED side mount pull up telescopic lights shall be installed in the large storage area ahead of the main hose bed, one left and one right. The extension pole shall rotate 360 degrees in the up position they will be controlled by two (2) switches in the cab. Units will be supplied by the customer.

361. ELECTRICAL - INVERTER/CHARGER - WIRING - CUSTOM CHASSIS

Wiring for the inverter will be provided to the specified location of the outlets or power distribution panel.

The battery charger supplied integral to the combination inverter/charger unit will be wired to the chassis battery system in order to charge and maintain the battery bank. All wiring will be done in accordance with the manufacturer's specifications.

362. ELECTRICAL - INVERTER/CHARGER - XANTREX FREEDOM HFS - 2KW/55A

One (1) Xantrex Freedom HFS series inverter with integral battery charger will be supplied and installed. The inverter will be capable of 2,000 watts of continuous power output at 16.9 amps with a surge rating of 4,000 watts. Output will be 120 VAC at 60Hz with a pure sine wave form allowing use of sensitive electronics. The inverter will automatically shut down if battery voltage drops below 10.5VDC or exceeDS12.1VDC. The inverter will have an optimal operating temperature range of -20°C to 50°C.

An integral 30-amp automatic transfer switch will allow pass through of 120VAC shoreline power if available. Once shoreline power is disconnected power will automatically switch back to the inverter.

The inverter will be equipped with a three-stage battery charger capable of 40 amps at 12VDC continuous. The battery charger will operate in one of the three charging states when 120VAC shoreline power is available. The charging states are as follows:

Bulk Replaces 70-80% of charge at the fastest rate

Absorption Replenishes the remaining 20-30% at a slow safe rate

Float Voltage is reduced and held constant to prevent damage and maintain a full charge

The inverter will be supplied with a digital control panel that includes status indicators. The panel will be relocated to the left side switch panel of the center dash.

363. ELECTRICAL - POWER BAR - 6 OUTLET - 110V (EACH)

Two (2) 110-volt power bar with 6 outlets will be supplied and installed at the locations specified and wired as directed.

Mounted in the following locations:
One (1) in the cab, wired to inverter
One (1) in compartment DS2, wired to inverter
One (1) in compartment PS2, wired to inverter

364. PAINT - BODY - UNDERCOATING

The complete underside of the body will be coated using Core-Tek VPCI-368, a time proven coating that provides excellent protection. The coating will include the entire under portion of the body, the rear fender wells, and the inside of the body up to the level of the water tank. The coating meets ASTM B-117, G-85, D-1748 for salt spray, prohesion, and humidity.

365. PAINT - BODY - SINGLE AXLE - ONE TONE - PUMPER/RESCUE

Only the highest quality polyurethane paint will be used, to provide a high lustre and long lasting paint finish. The structure to be painted will have all hardware removed to ensure that all areas are protected by paint. The body will be thoroughly cleaned and sanded, before the base coat of epoxy is applied. Next, a coat of high build primer is applied and completely sanded to a smooth finish. A three step final finish provides a non-porous, chemical resistant surface giving a high sheen, acid resistant, long lasting finish.

The body will be painted and finished in one tone color. Fire engine red

366. PAINT - ROLL UP DOOR FINISH - SATIN

The roll up doors will be supplied by the door manufacturer with a satin finish.

367. PAINT - COMPARTMENT INTERIOR FINISH - YELLOW EPOXY

The interior of all compartments will be prepared and painted with an epoxy trunk splatter finish. The color will be either yellow as determined during the preconstruction meeting.

368. STRIPING - DECAL - DEPARTMENT CREST (PAIR)

A pair of Fire Department crests will be provided and applied to the apparatus cab doors. The design file will be supplied by the Fire Department in a format suitable for digital printing.

369. STRIPING - DECAL - CANADIAN FLAG (PAIR)

One (1) pair of waving Canadian Flag decals will be supplied and applied to either the cab or body of the completed apparatus. Each decal will measure approximately 12" in width and 8" in height.

370. STRIPING - DECAL - CALL 911 (PAIR)

One (1) pair of decals with the specified variation of “Call 911” graphic will be supplied and applied to either the cab or body of the completed apparatus.

371. STRIPING - LETTERING - CAB DOORS

Lettering 6" to 8" in height identifying the Fire Department name and truck identification will be applied to the cab doors. Font, colours, design and placement will be discussed prior to application, as the apparatus nears completion.

372. STRIPING - LETTERING - BODY SIDES

Lettering 8" to 12" in height, will be applied to both sides of the body. Font, colours, design and placement will be discussed prior to application, as the apparatus nears completion.

373. STRIPING - REFLECTIVE 6" SIDE - ROLL UP DOORS

A 6" wide reflective stripe shall be applied the full length of the body and cab sides, including the roll up doors. This stripe shall continue to the front face of the cab where space allows.

Colour:
White

374. STRIPING - REFLECTIVE 1/4" SIDE - OUTLINE STRIPES

Outline stripes measuring 1/4" shall be applied the full length of the main reflective striping, both the top and bottom edges.

Colour:
Yellow

375. STRIPING - REFLECTIVE CHEVRON - BODY REAR COMPLETE

Chevron striping will be applied to the entire rear face of the body with the exception of items fixed to the rear of the body such as warning lights, handrails, beavertails etc. The striping will consist of a series of 6" reflective stripes angled towards the ground on the respective side of the vehicle. Red and Yellow in colour.

376. WHEELS - BABY MOONS AND LUG NUT COVERS - SINGLE AXLE - CHROME

Chrome nut covers will be supplied to the front and rear wheels of the vehicle. Baby moons will be supplied to the front and rear wheels.

377. LABEL - CAN/ULC-S515-13 TESTING AND LABEL - IMPERIAL

After the completion of the vehicle, and before it is delivered to the customer, a representative from the Underwriters Laboratory of Canada (U.L.C.) will take the vehicle through a test to make sure it meets all the U.L.C. requirements. Some of these tests will be: pump test, lighting, road test, and weight distributions on the axles. After the test is completed, a label will be issued from the U.L.C. to confirm that the vehicle met all the requirements. The label will be located at the pump panel.

378. LABEL - FLUID TYPE AND CAPACITY

A permanent label plate for the vehicle fluid type and capacity will be supplied. The plate will be mounted in the driver’s compartment.

379. LABEL - WARNING AND SAFETY LABEL PACKAGE

The apparatus will be fitted with all the safety and warning labels required in the current standards publication by Underwriters" Laboratory of Canada.

380. VEHICLE INSPECTION

The vehicle will be inspected at an authorized Provincial motor vehicle inspection station prior to delivery. The safety inspection decal will be affixed to the window.

381. VEHICLE CLEAN UP AND DETAILING

Prior to the final delivery, the vehicle will be professionally cleaned and detailed.

382. QUALITY CONTROL CHECK

The apparatus" will undergo a full quality control inspection once the apparatus is completed.

383. TRANSPORTATION SAFETY KIT

Transportation safety kit will be supplied, and will include:
One (1) first aid kit.
One (1) 2.5 lb. ABC fire extinguisher.
One (1) set of dual faced triangular warning flares.
One (1) reflective safety vest

384. EQUIPMENT - CAN/ULC-S515-13 AND NFPA 1901-2009

All loose equipment that is required for this apparatus as specified in CAN/ULC-S515-13 section 4.9 and recommended in NFPA 1901-2009 section 5.8 and not listed in this proposal will be the responsibility of the fire department to provide. A letter signed and dated by the appropriate representative of the department stating that this equipment is being provided by the fire department will be supplied prior to scheduling a ULC test date for the proposed apparatus.

-END OF ERRINGTON VOLUNTEER FIRE DEPARTMENT PROPOSAL SUBMISSION-